6

Troubleshooting

This chapter provides descriptions of the drive faults, alarms, errors, related displays, and guidance for troubleshooting. This chapter can also serve as a reference guide for tuning the drive during a trial run.

6.1 Section Safety

⚠ DANGER

Electrical Shock Hazard

Do not connect or disconnect wiring while the power is on.

Failure to comply will result in death or serious injury.

⚠ WARNING

Electrical Shock Hazard

Do not operate equipment with covers removed.

Failure to comply could result in death or serious injury.

The diagrams in this section may illustrate drives without covers or safety shields to display details. Be sure to reinstall covers or shields before operating the drives and run the drives according to the instructions described in this manual.

Always ground the motor-side grounding terminal.

Improper equipment grounding could result in death or serious injury by contacting the motor case.

Do not touch terminals before the capacitors have fully discharged.

Failure to comply could result in death or serious injury.

Before wiring terminals, disconnect all power to the equipment. The internal capacitor remains charged even after the drive input power is turned off. After shutting off the power, wait for at least the amount of time specified on the drive before touching any components.

Do not allow unqualified personnel to perform work on the drive.

Failure to comply could result in death or serious injury.

Installation, maintenance, inspection and servicing must be performed only by authorized personnel familiar with installation, adjustment and maintenance of AC drives.

Do not perform work on the drive while wearing loose clothing, jewelry, or without eye protection.

Failure to comply could result in death or serious injury.

Remove all metal objects such as watches and rings, secure loose clothing and wear eye protection before beginning work on the drive.

Do not remove covers or touch circuit boards while the power is on.

Failure to comply could result in death or serious injury.

Fire Hazard

Tighten all terminal screws to the specified tightening torque.

Loose electrical connections could result in death or serious injury by fire due to overheating of electrical connections.

Do not use an improper voltage source.

Failure to comply could result in death or serious injury by fire.

Verify that the rated voltage of the drive matches the voltage of the incoming drive input power before applying power.

⚠ WARNING

Do not use improper combustible materials.

Failure to comply could result in death or serious injury by fire.

Attach the drive to metal or other noncombustible material.

NOTICE

Observe proper electrostatic discharge procedures (ESD) when handling the drive and circuit boards.

Failure to comply may result in ESD damage to the drive circuitry.

Never connect or disconnect the motor from the drive while the drive is outputting voltage.

Improper equipment sequencing could result in damage to the drive.

Do not use unshielded cable for control wiring.

Failure to comply may cause electrical interference resulting in poor system performance. Use shielded twisted-pair wires and ground the shield to the ground terminal of the drive.

Do not allow unqualified personnel to use the product.

Failure to comply could result in damage to the drive or braking circuit.

Carefully review instruction manual TOBP C720600 00 when connecting a dynamic braking option to the drive.

Do not modify the drive circuitry.

Failure to comply could result in damage to the drive and will void warranty.

Yaskawa is not responsible for modification of the product made by the user.

Check all the wiring after installing the drive and connecting other devices to ensure that all connections are correct.

Failure to comply could result in damage to the drive.

Troubleshooting

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6.2 Motor Performance Fine-Tuning

This section offers helpful information for counteracting oscillation, hunting, or other problems that occur while performing a trial run. Refer to the section below that corresponds to the motor control method used.

> **Note:** This section describes parameters that are commonly edited and may be set incorrectly. Consult Yaskawa for more information on detailed settings and fine-tuning the drive.

◆ Fine-Tuning V/f Control and V/f Control with PG

Table 6.1 Parameters for Fine-Tuning Performance in V/f and V/f w/PG

Problem	Parameter No.	Corrective Action	Default	Suggested Setting
Motor hunting and oscillation at speeds between 10 and 40 Hz	Hunting Prevention Gain (n1-02)	• If insufficient motor torque relative to the size of the load causes hunting, reduce the setting. • When motor hunting and oscillation occur with a light load, increase the setting. • Lower this setting if hunting occurs when using a motor with a relatively low inductance, such as a high-frequency motor or a motor with a larger frame size.	1.00	0.10 to 2.00
• Motor noise • Motor hunting and oscillation at speeds up to 40 Hz	Carrier Frequency Selection (C6-02)	• If the motor noise is too loud, increase the carrier frequency. • When motor hunting and oscillation occur at speeds up to 40 Hz, lower the carrier frequency. • The default setting for the carrier frequency depends on the drive capacity (o2-04) and the Duty Selection (C6-01).	1 (2 kHz)	1 to max. setting
• Poor torque or speed response • Motor hunting and oscillation	Torque Compensation Primary Delay Time (C4-02)	• If motor torque and speed response are too slow, decrease the setting. • If motor hunting and oscillation occur, increase the setting.	200 ms <1>	100 to 1000 ms
• Poor motor torque at speeds below 10 Hz • Motor hunting and oscillation	Torque Compensation Gain (C4-01)	• If motor torque is insufficient at speeds below 10 Hz, increase the setting. • If motor hunting and oscillation with a relatively light load, decrease the setting.	1.00	0.50 to 1.50
• Poor motor torque at low speeds • Motor instability at motor start	Mid Output Voltage A (E1-08) Minimum Output Voltage (E1-10)	• If torque is insufficient at speeds below 10 Hz, increase the setting. • If motor instability occurs at motor start, decrease the setting. **Note:** The recommended setting value is for 200 V class drives. Double this value when using a 400 V class drive.	E1-08: 15.0 V E1-10: 9.0 V <2>	Default setting ±5 V
Poor speed precision (V/f control)	Slip Compensation Gain (C3-01)	After setting the motor-rated current (E2-01), motor-rated slip (E2-02), and motor no-load current (E2-03), adjust the slip compensation gain (C3-01).	0.0 (no slip compensation)	0.5 to 1.5
Poor speed precision (V/f control with PG)	ASR Proportional Gain 1 (C5-01) ASR Integral Time 1 (C5-02) <3> <4>	Adjust the ASR proportional gain 1 (C5-01) and the ASR integral time 1 (C5-02).	C5-01: 0.20 C5-02: 0.200	Proportional gain = 0.10 to 1.00 Integral time = 0.100 to 2.000

<1> Default setting value is dependent on parameter A1-02, Control Method Selection, and o2-04, Drive Model Selection.
<2> Default settings change when the Control Method is changed (A1-02) or a different V/f pattern is selected using parameter E1-03.
<3> ASR in V/f Control with PG only controls the output frequency, and therefore does not allow the high gain settings possible when using Close Loop Vector control.
<4> Refer to *C5: Automatic Speed Regulator (ASR) on page 173* for details on Automatic Speed Regulator (ASR).

◆ Fine-Tuning Open Loop Vector Control

Table 6.2 Parameters for Fine-Tuning Performance in OLV

Problem	Parameter No.	Corrective Action	Default	Suggested Setting
• Poor motor torque and speed response • Motor hunting and oscillation at speeds between 10 and 40 Hz	AFR Gain (n2-01)	• If motor torque and speed response are too slow, gradually decrease the setting by 0.05. • If motor hunting and oscillation occur, gradually increase the setting by 0.05.	1.00	0.50 to 2.00
• Poor motor torque and speed response • Motor hunting and oscillation at speeds between 10 and 40 Hz	AFR Time Constant 1 (n2-02)	• To improve motor torque speed response, gradually reduce this setting by 10 ms and check the performance. • If motor hunting and oscillation occur as a result of load inertia, gradually increase the setting by 50 ms and check the performance. **Note:** Ensure that n2-02 ≤ n2-03. When changing n2-02, set C4-02 (Torque Compensation Primary Delay Time Constant 1) accordingly.	50 ms	50 to 2000 ms
Overvoltage trips when accelerating, decelerating, or during sudden speed or load changes.	AFR Time Constant 2 (n2-03)	• If overvoltage occur, gradually increase this setting by 50 ms. • If response is slow, gradually reduce this setting by 10 ms. **Note:** Ensure that n2-02 ≤ n2-03. When making adjustments to n2-03, increase the value of C4-06 (Torque Compensation Primary Delay Time 2) proportionally.	750 ms	750 to 2000 ms
	Torque Compensation Primary Delay Time Constant 2 (C4-06)	• If overvoltage trips occur, gradually increase this setting by 10 ms and check the performance. • If response is slow, gradually reduce this setting by 2 ms and check the performance. **Note:** Ensure that C4-02 ≤ C4-06. When changing C4-06 (Torque Compensation Primary Delay Time Constant 2), increase the value of n2-03 proportionally.	150 ms	150 to 750 ms

Problem	Parameter No.	Corrective Action	Default	Suggested Setting
• Poor motor torque and speed response • Motor hunting and oscillation	Torque Compensation Primary Delay Time Constant 1 (C4-02)	• To improve motor torque speed response, gradually reduce this setting by 2 ms and check the performance. • If motor hunting and oscillation occur, gradually increase this setting by 10 ms. **Note:** Ensure that C4-02 ≤ C4-06. When making adjustments to C4-02, increase the AFR time constant (n2-02) proportionally.	20 ms *<1>*	20 to 100 ms *<1>*
Poor speed response and stability	Slip Compensation Primary Delay Time Constant (C3-02)	• If response is slow, gradually decrease the setting by 10 ms. • If speed is unstable, gradually increase the setting by 10 ms.	200 ms *<2>*	100 to 500 ms
Poor speed precision	Slip Compensation Gain (C3-01)	• If speed is too slow, gradually increase the setting by 0.1 ms. • If speed is too fast, gradually decrease the setting by 0.1 ms.	1.0 *<2>*	0.5 to 1.5
Poor speed precision during regenerative operation	Slip Compensation Selection During Regeneration (C3-04)	Enable slip compensation during regeneration by setting parameter C3-04 = 1.	0	1
• Motor noise • Motor hunting and oscillation occur at speeds below 10 Hz	Carrier Frequency Selection (C6-02)	• If there is too much motor noise, the carrier frequency is too low. • If motor hunting and oscillation occur at low speeds, reduce the carrier frequency. **Note:** The default setting for the carrier frequency depends on the drive capacity (o2-04) and Duty Selection (C6-01).	1 (2 kHz)	0 to max. setting
• Poor motor torque at low speeds • Poor speed response • Motor instability at start	Mid Output Voltage A (E1-08) Minimum Output Voltage (E1-10)	• If motor torque and speed response are too slow, increase the setting. • If the motor exhibits excessive instability at start-up, reduce the setting. **Note:** The default value is for 200 V class units. Double this value when using a 400 V class drive. When working with a relatively light load, increasing this value too much can result in overtorque.	E1-08: 11.0 V *<2>* E1-10: 2.0 V *<2>*	Default setting ±2 V

<1> Default setting value is dependent on parameter A1-02, Control Method Selection, and o2-04, Drive Model Selection.
<2> Default settings change when the Control Method is changed (A1-02) or a different V/f pattern is selected using parameter E1-03.

When using OLV, leave the torque compensation gain (C4-01) at its default setting of 1.00.

◆ Fine-Tuning Closed Loop Vector Control

Table 6.3 Parameters for Fine-Tuning the Performance in CLV

Problem	Parameter No.	Corrective Action	Default	Suggested Setting
• Poor torque or speed response • Motor hunting and oscillation	ASR Proportional Gain 1 (C5-01) ASR Proportional Gain 2 (C5-03) *<1>*	• If motor torque and speed response are too slow, gradually increase the ASR gain setting by 5. • If motor hunting and oscillation occur, decrease the setting. • Parameter C5-03 needs to be adjusted only if C5-05 > 0. • Perform ASR Auto-Tuning if possible.	20.00	10.00 to 50.00
• Poor torque or speed response • Motor hunting and oscillation	ASR Integral Time 1 (C5-02) ASR Integral Time 2 (C5-04) *<1>*	• If motor torque and speed response are too slow, decrease the setting. • If motor hunting and oscillation occur, increase the setting. • Parameter C5-04 needs to be adjusted only if C5-05 > 0.	0.500 s	0.300 to 1.000 s
Trouble maintaining the ASR proportional gain or the integral time at the low or high end of the speed range	ASR Gain Switching Frequency (C5-07) *<1>*	Have the drive switch between two different ASR proportional gain and integral time settings based on the output frequency.	0.0 Hz	0.0 to max output frequency
Motor hunting and oscillation	ASR Primary Delay Time Constant (C5-06) *<1>*	• If motor torque and speed response are too slow, gradually decrease the setting by 0.01. • If the load is less rigid and subject to oscillation, increase this setting.	0.004 s	0.004 to 0.020 s
• Motor noise • Control motor hunting and oscillation occur at speeds below 3 Hz.	Carrier Frequency Selection (C6-02)	• If there is too much motor noise, the carrier frequency is too low. • If motor hunting and oscillation occur at low speeds, reduce the carrier frequency. **Note:** The default setting for the carrier frequency depends on the drive capacity (o2-04) and Drive Duty Selection (C6-01).	1	2.0 kHz to the max. setting
Overshoot or undershoot when the speed changes with high inertia load.	Feed Forward Control (n5-01) Inertia Tuning (T1-01 = 8)	Enable Feed Forward by setting parameter n5-01 = 1 and perform Inertia Tuning. If Inertia Tuning is not possible, set parameters C5-17, C5-18, and n5-03 manually.	0	1

<1> Refer to *C5: Automatic Speed Regulator (ASR) on page 173* for details on Automatic Speed Regulator (ASR).

◆ Fine-Tuning Open Loop Vector Control for PM Motors

Table 6.4 Parameters for Fine-Tuning Performance in OLV/PM

Problem	Parameter No.	Corrective Action	Default	Suggested Setting
Motor performance not as desired	Motor parameters (E1-□□, E5-□□)	• Check the settings for base and maximum frequency in the E1-□□ parameters • Check E5-□□ parameters and make sure all motor data has been set correctly. Be careful not to enter line to line data where single-phase data is required, and vice versa. • Perform Auto-Tuning.	-	-
Poor motor torque and speed response	Load Inertia Ratio (n8-55)	Adjust parameter n8-55 to meet the load inertia ratio of the machine.	0	Close to the actual load inertia ratio
	Speed Feedback Detection Gain (n8-45)	Decrease the speed feedback detection gain (n8-45).	0.8	Decrease in decrements of 0.05
	Torque Compensation (C4-01)	Enable torque compensation. **Note:** Setting this value too high can cause overcompensation and motor oscillation.	0	1

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Problem	Parameter No.	Corrective Action	Default	Suggested Setting
Oscillation at start or the motor stalls	Pull-In Current during Accel/Decel (n8-51)	Increase the pull-in current set in n8-51	50%	Increase in steps of 5%
	DC Injection Braking Current (b2-02), DC Injection Time at Start (b2-03)	Use DC Injection Braking at start to align the rotor. Be aware that this operation can cause a short reverse rotation at start.	b2-02 = 50% b2-03 = 0.0 s	b2-03 = 0.5 s Increase b2-02 if needed
	Load Inertia Ratio (n8-55)	Increase the load inertia ratio. **Note:** Setting this value too high can cause overcompensation and motor oscillation.	0	Close to the actual load inertia ratio
Stalling or oscillation occur when load is applied during constant speed	Pull-In Current Compensation Time Constant (n8-47)	Decrease n8-47 if hunting occurs during constant speed	5.0 s	Reduce in increments of 0.2 s
	Pull-In Current (n8-48)	Increase the pull-in current in n8-48.	30%	Increase in increments of 5%
	Load Inertia Ratio (n8-55)	Increase the load inertia ratio.	0	Close to the actual load inertia ratio
Hunting or oscillation occur	Speed feedback Detection Gain (n8-45)	Increase the speed feedback detection gain in n8-45.	0.8	Increase in increments 0.05
STO fault trips even if the load is not too high	Induced Voltage Constant (E5-09 or E5-24)	• Check and adjust the induced voltage constant. • Check the motor name plate, the data sheet or contact the motor manufacturer for getting data.	dep. on drive capacity and motor code	Refer to the motor data sheet or the nameplate.
Stalling or STO occurs at high speed as the output voltage becomes saturated.	Output Voltage Limit (n8-62)	Set the value of the input voltage to parameter n8-62. Never set the value higher than the actual input voltage.	200 Vac or 400 Vac	Set the value lower than the actual input voltage.

◆ Fine-Tuning Advanced Open Loop Vector Control for PM Motors

Table 6.5 Parameters for Fine-Tuning Performance in AOLV/PM

Problem	Parameter No.	Corrective Action	Default	Suggested Setting
• Poor torque or speed response • Motor hunting and oscillation	ASR Proportional Gain 1 (C5-01) ASR Proportional Gain 2 (C5-03)	• If motor torque and speed response are too slow, gradually increase the setting by 5. • If motor hunting and oscillation occur, decrease the setting. • Parameter C5-03 needs to be adjusted only if C5-05 > 0.	10.00	5.00 to 30.00 *<1>*
• Poor torque or speed response • Motor hunting and oscillation	ASR Integral Time 1 (C5-02) ASR Integral Time 2 (C5-04)	• If motor torque and speed response are too slow, decrease the setting. • If motor hunting and oscillation occur, increase the setting. • Parameter C5-03 needs to be adjusted only if C5-05 > 0	0.500 s	0.300 to 1.000 s *<1>*
Trouble maintaining the ASR proportional gain or the integral time at the low or high end of the speed range	ASR Gain Switching Frequency (C5-07)	Have the drive switch between two different ASR proportional gain and integral time settings based on the output frequency.	0.0%	0.0 to Max r/min
Motor hunting and oscillation	ASR Primary Delay Time Constant (C5-06)	If the load is less rigid and subject to oscillation, increase this setting.	0.010 s	0.016 to 0.035 s *<1>*
Motor stalling makes normal operation impossible	Motor parameters (E1-□□, E5-□□)	Check the motor parameter settings.	-	-

<1> Optimal settings will differ between no-load and loaded operation.

◆ Fine-Tuning Closed Loop Vector Control for PM Motors

Table 6.6 Parameters for Fine-Tuning Performance in CLV/PM

Problem	Parameter No.	Corrective Action	Default	Suggested Setting
• Poor torque or speed response • Motor hunting and oscillation	ASR Proportional Gain 1 (C5-01) ASR Proportional Gain 2 (C5-03)	• If motor torque and speed response are too slow, gradually increase the setting by 5. • If motor hunting and oscillation occur, decrease the setting. • Perform ASR Gain Auto-Tuning if possible	20.00	10.00 to 50.00 *<1>*
• Poor torque or speed response • Motor hunting and oscillation	ASR Integral Time 1 (C5-02) ASR Integral Time 2 (C5-04)	• If motor torque and speed response are too slow, decrease the setting. • If motor hunting and oscillation occur, increase the setting.	0.500 s	0.300 to 1.000 s *<1>*
ASR proportional gain or the integral time at the low or high end of the speed range	ASR Gain Switching Frequency (C5-07)	Have the drive switch between two different ASR proportional gain and integral time settings based on the output frequency.	0.0%	0.0 to Max r/min
Motor hunting and oscillation	ASR Primary Delay Time Constant (C5-06)	If the load is less rigid and subject to oscillation, increase this setting.	0.016 s	0.004 to 0.020 s *<1>*
Motor stall makes normal operation impossible	Motor parameters (E1-□□, E5-□□)	Check the motor parameter settings.	-	-
Overshoot or undershoot at speed changes with high inertia load.	Feed Forward Control (n5-01) Inertia Auto-Tuning (T2-01 = 8)	Enable Feed Forward Control by setting parameter n5-01 = 1 and perform Inertia Auto-Tuning. If Auto-Tuning cannot be performed set parameters C5-17, C5-18 and n5-03 manually.	0	1

<1> Optimal settings will differ between no-load and loaded operation.

◆ Parameters to Minimize Motor Hunting and Oscillation

In addition to the parameters discussed on page , the following parameters indirectly affect motor hunting and oscillation.

Table 6.7 Parameters that Affect Control Performance in Applications

Name (Parameter No.)	Application
Dwell Function (b6-01 through b6-04)	Prevents motor speed loss by maintaining the output frequency when working with heavy loads or when there is powerful backlash on the machine side.
Droop Function (b7-01, b7-02)	Used to balance the load between two motors that drive the same load. Can be used when the control method (A1-02) is set to 3 or 7.
Accel/Decel Time (C1-01 through C1-11)	Adjusting accel and decel times will affect the torque presented to the motor during acceleration or deceleration.
S-Curve Characteristics (C2-01 through C2-04)	Prevents shock at the beginning and end of acceleration and deceleration.
Jump Frequency (d3-01 through d3-04)	Skips over the resonant frequencies of connected machinery.
Analog Filter Time Constant (H3-13)	Prevents fluctuation in the analog input signal due to noise.
Stall Prevention (L3-01 through L3-06, L3-11)	• Prevents motor speed loss and overvoltage. Used when the load is too heavy and also during sudden acceleration/deceleration. • Adjustment is not normally required because Stall Prevention is enabled as a default. Disable Stall Prevention during deceleration (L3-04 = "0") when using a braking resistor.
Torque Limits (L7-01 through L7-04, L7-06, L7-07)	• Sets the maximum torque for Open Loop Vector Control. • Ensure that the drive capacity is greater than the motor capacity when increasing this setting. Be careful when reducing this value because motor speed loss may occur with heavy loads.
Feed Forward Control (n5-01 through n5-03)	Used to increase response for acceleration/deceleration or to reduce overshooting when there is low machine rigidity and the gain of the speed controller (ASR) cannot be increased. The inertia ratio between the load and motor and the acceleration time of the motor running alone must be set.

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6.3   Drive Alarms, Faults, and Errors

◆ Types of Alarms, Faults, and Errors

Check the digital operator for information about possible faults if the drive or motor fails to operate. *Refer to Using the Digital Operator on page 89*.

If problems occur that are not covered in this manual, contact the nearest Yaskawa representative with the following information:

- Drive model
- Software version
- Date of purchase
- Description of the problem

Table 6.8 contains descriptions of the various types of alarms, faults, and errors that may occur while operating the drive.

Contact Yaskawa in the event of drive failure.

Table 6.8 Types of Alarms, Faults, and Errors

Type	Drive Response
Faults	When the drive detects a fault: • The digital operator displays text that indicates the specific fault and the ALM indicator LED remains lit until the fault is reset. • The fault interrupts drive output and the motor coasts to a stop. • Some faults allow the user to select how the drive should stop when the fault occurs. • Fault output terminals MA-MC will close, and MB-MC will open. The drive will remain inoperable until that fault has been cleared. *Refer to Fault Reset Methods on page 342*.
Minor Faults and Alarms	When the drive detects an alarm or a minor fault: • The digital operator displays text that indicates the specific alarm or minor fault, and the ALM indicator LED flashes. • The drive generally continues running the motor, although some alarms allow the user to select a stopping method when the alarm occurs. • One of the multi-function contact outputs closes if set to be tripped by a minor fault (H2- □□ = 10), but not by an alarm. • The digital operator displays text indicating a specific alarm and ALM indicator LED flashes. To reset the a minor fault or alarm, remove whatever is causing the problem.
Operation Errors	When parameter settings conflict with one another or do not match hardware settings (such as with an option card), it results in an operation error. When the drive detects an operation error: • The digital operator displays text that indicates the specific error. • Multi-function contact outputs do not operate. The drive will not operate the motor until the error has been reset. Correct the settings that caused the operation error to clear the error.
Tuning Errors	Tuning errors occur while performing Auto-Tuning. When the drive detects a tuning error: • The digital operator displays text indicating the specific error. • Multi-function contact outputs do not operate. • Motor coasts to stop. Remove the cause of the error and repeat the Auto-Tuning process.
Copy Function Errors	These are the types of errors that can occur when using the optional digital operator or the USB Copy Unit to copy, read, or verify parameter settings. • The digital operator displays text indicating the specific error. • Multi-function contact outputs do not operate. Pressing any key on the operator will clear the fault. Find out what is causing the problem (such as model incompatibility) and try again.

◆ Alarm and Error Displays

■ Faults

Table 6.9 gives an overview of possible fault codes. As conditions such as overvoltage can trip both a fault and an alarm, it is important to distinguish between faults and alarms in order to find the right corrective action.

When the drive detects a fault, the ALM indicator LEDs lights and the fault code appears on the display. The drive fault contact MA-MB-MC will be triggered. If the ALM LED blinks and the code appearing on the operator screen is flashes, then an alarm has been detected. See *Minor Faults and Alarms on page 310* for a list of alarm codes.

Table 6.9 Fault Displays (1)

Digital Operator Display		Name	Page	Digital Operator Display		Name	Page
LED Operator	LCD Operator			LED Operator	LCD Operator		
boL	boL	Braking Transistor Overload Fault	314	Err	Err	EEPROM Write Error	317
bUS	bUS	Option Communication Error	314	FAn	FAn	Internal Fan Fault	317
CE	CE	MEMOBUS/Modbus Communication Error	314	FbH	FbH	Excessive PID Feedback	317
CF	CF	Control Fault	314	FbL	FbL	PID Feedback Loss	318
CPF00, CPF01 <1>	CPF00, CPF01	Control Circuit Error	314	GF	GF	Ground Fault	318
CPF02	CPF02	A/D Conversion Error	314	LF	LF	Output Phase Loss	318
CPF03	CPF03	Control Board Connection Error	315	LF2	LF2	Current Imbalance	318
CPF06	CPF06	EEPROM Memory Data Error	315	LF3 <2>	LF3	Power Unit Output Phase Loss 3	318
CPF07, CPF08	CPF07, CPF08	Terminal Board Connection Error	315	nSE	nSE	Node Setup Error	319
CPF20, CPF21 <1>	CPF20, CPF21	Control Circuit Error	315	oC	oC	Overcurrent	319
CPF22	CPF22	Hybrid IC Error	315	oFA00	oFA00	Option Card Connection Error (CN5-A)	319
CPF23	CPF23	Control Board Connection Error	315	oFA01	oFA01	Option Card Fault (CN5-A)	319
CPF24	CPF24	Drive Unit Signal Fault	315	oFA03 to oFA06	oFA03 to oFA06	Option Card Error (CN5-A)	319
CPF26 to CPF34, CPF40 to CPF45 <2>	CPF26 to CPF34, CPF40 to CPF45	Control Circuit Error	315	oFA10, oFA11	oFA10, oFA11	Option Card Error (CN5-A)	319
dEv	dEv	Excessive Speed Deviation (for Control Mode with PG)	316	oFA12 to oFA17	oFA12 to oFA17	Option Card Connection Error (CN5-A)	319
dv1	dv1	Z Pulse Fall Detection	316	oFA30 to oFA43	oFA30 to oFA43	Option Card Connection Error (CN5-A)	319
dv2	dv2	Z Pulse Noise Fault Detection	316	oFb00	oFb00	Option Card Connection Error (CN5-B)	320
dv3	dv3	Inversion Detection	316	oFb01	oFb01	Option Card Fault (CN5-B)	320
dv4	dv4	Inversion Prevention Detection	316	oFb02	oFb02	Option Card Fault (CN5-B)	320
dv7 <3> <4>	dv7	Polarity Judge Timeout	316	oFb03, oFb11	oFb03, oFb11	Option Card Error (CN5-B)	320
dWFL	dWFL	DriveWorksEZ Fault	316	oFb12 to oFb17	oFb12 to oFb17	Option Card Connection Error (CN5-B)	320
E5	E5	SI-T3 Watchdog Timer Error	317	oFC00	oFC00	Option Card Connection Error (CN5-C)	320
EF0	EF0	Option Card External Fault	317	oFC01	oFC01	Option Card Fault (CN5-C)	320
EF1 to EF8	EF1 to EF8	External Fault (input terminal S1 to S8)	317	oFC02	oFC02	Option Card Fault (CN5-C)	320

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Table 6.10 Fault Displays (2)

Digital Operator Display		Name	Page	Digital Operator Display		Name	Page
LED Operator	LCD Operator			LED Operator	LCD Operator		
oFC03, oFC11	oFC03, oFC11	Option Card Error (CN5-C)	*320*	*PGo*	PGo	PG Disconnect (for Control Mode with PG)	*324*
oFC12 to *oFC17*	oFC12 to oFC17	Option Card Connection Error (CN5-C)	*320*	*PGoH*	PGoH	PG Hardware Fault (when using PG-X3)	*324*
oH	oH	Heatsink Overheat	*321*	*rF*	rF	Braking Resistor Fault	*324*
oH1	oH1	Heatsink Overheat	*321*	*rH*	rH	Dynamic Braking Resistor	*324*
oH3	oH3	Motor Overheat Alarm (PTC Input)	*321*	*rr*	rr	Dynamic Braking Transistor	*324*
oH4	oH4	Motor Overheat Fault (PTC Input)	*321*	*SC* <3><4>	SC	IGBT Upper Arm and Lower Arm Short Circuit	*324*
oH5 <2>	oH5	Motor Overheat (NTC Input)	*321*	*SEr*	SEr	Too Many Speed Search Restarts	*325*
oL1	oL1	Motor Overload	*322*	*STo*	STo	Pull-Out Detection	*325*
oL2	oL2	Drive Overload	*322*	*SvE*	SvE	Zero-Servo Fault	*325*
oL3	oL3	Overtorque Detection 1	*322*	*THo* <2>	THo	Thermistor Disconnect	*325*
oL4	oL4	Overtorque Detection 2	*322*	*UL3*	UL3	Undertorque Detection 1	*325*
oL5	oL5	Mechanical Weakening Detection 1	*322*	*UL4*	UL4	Undertorque Detection 2	*325*
oL7	oL7	High Slip Braking oL	*323*	*UL5*	UL5	Mechanical Weakening Detection 2	*325*
oPr	oPr	Operator Connection Fault	*323*	*UnbC* <2>	UnbC	Current Unbalance	*325*
oS	oS	Overspeed (for Control Mode with PG)	*323*	*Uv1*	Uv1	Undervoltage	*325*
ov	ov	Overvoltage	*323*	*Uv2*	Uv2	Control Power Supply Undervoltage	*326*
PF	PF	Input Phase Loss	*324*	*Uv3*	Uv3	Soft Charge Circuit Fault	*326*
				Uv4 <2>	Uv4	Gate Drive Board Undervoltage	*326*
				voF	voF	Output Voltage Detection Fault	*326*

<1> Displayed as *CPF00* or *CPF20* when occurring at drive power up. When one of the faults occurs after successfully starting the drive, the display will show *CPF01* or *CPF21*.
<2> Occurs in models CIMR-A□4A0930 and 4A1200.
<3> Valid from the drive software version S1015 and later.
<4> Invalid in models CIMR-A□4A0930 and 4A1200.

■ Minor Faults and Alarms

Table 6.11 give an overview of possible alarm codes. As conditions such as overvoltage can trip both a fault and alarm, it is important to distinguish between faults and alarms in order to find the right corrective action.

If an alarm is detected, the ALM LED will blink and the alarm code display flashes. The majority of alarms will trigger a digital output programmed for alarm output (H2-□□ = 10). If the ALM LED lights without blinking, this means that a fault has been detected (not an alarm). Information on fault codes can be found in *Faults on page 309*.

Table 6.11 Minor Fault and Alarm Displays

Digital Operator Display		Name	Minor Fault Output (H2-□□ = 10)	Page
LED Operator	LCD Operator			
AEr	AEr	SI-T Station Number Setting Error (CC-Link, CANopen, MECHATROLINK-II)	YES	*327*
bb	bb	Drive Baseblock	No output	*327*
boL	boL	Braking Transistor Overload Fault	YES	*327*
bUS	bUS	Option Card Communications Error	YES	*327*
CALL	CALL	Serial Communication Transmission Error	YES	*327*
CE	CE	MEMOBUS/Modbus Communication Error	YES	*328*
CrST	CrST	Cannot Reset	YES	*328*

Digital Operator Display		Name	Minor Fault Output (H2-□□ = 10)	Page
LED Operator	**LCD Operator**			
dEu	dEv	Excessive Speed Deviation (for Control Mode with PG)	YES	*328*
dnE	dnE	Drive Disabled	YES	*328*
duuAL	dWAL	DriveWorksEZ Alarm	YES	*316*
E5	E5	SI-T3 Watchdog Timer Error	YES	*317*
EF	EF	Run Command Input Error	YES	*328*
EF0	EF0	Option Card External Fault	YES	*328*
EF1 to	EF1 to EF8	External Fault (input terminal S1 to S8)	YES	*328*
FbH	FbH	Excessive PID Feedback	YES	*329*
FbL	FbL	PID Feedback Loss	YES	*329*
Hbb	Hbb	Safe Disable Signal Input	YES	*329*
HbbF	HbbF	Safe Disable Signal Input	YES	*329*
HCA	HCA	Current Alarm	YES	*329*
LT-1	LT-1	Cooling Fan Maintenance Time	No output *<1>*	*329*
LT-2	LT-2	Capacitor Maintenance Time	No output *<1>*	*330*
LT-3	LT-3	Soft Charge Bypass Relay Maintenance Time	No output *<1>*	*330*
LT-4	LT-4	IGBT Maintenance Time (50%)	No output *<1>*	*330*
oH	oH	Heatsink Overheat	YES	*330*
oH2	oH2	Drive Overheat	YES	*330*
oH3	oH3	Motor Overheat	YES	*330*
oH5 *<2>*	oH5	Motor Overheat (NTC Input)	YES	*330*
oL3	oL3	Overtorque 1	YES	*330*
oL4	oL4	Overtorque 2	YES	*331*
oL5	oL5	Mechanical Weakening Detection 1	YES	*331*
oS	oS	Overspeed (for Control Mode with PG)	YES	*331*
ou	ov	Overvoltage	YES	*331*
PASS	PASS	MEMOBUS/Modbus Test Mode Complete	No output	*331*
PGo	PGo	PG Disconnect (for Control Mode with PG)	YES	*331*
PGoH	PGoH	PG Hardware Fault (when using PG-X3)	YES	*331*
rUn	rUn	During Run 2, Motor Switch Command Input	YES	*331*
SE	SE	MEMOBUS/Modbus Test Mode Fault	YES	*332*
THo *<2>*	THo	Thermistor Disconnect	YES	*332*
TrPC	TrPC	IGBT Maintenance Time (90%)	YES	*332*
UL3	UL3	Undertorque 1	YES	*332*
UL4	UL4	Undertorque 2	YES	*332*
UL5	UL5	Mechanical Weakening Detection 2	YES	*325*
Uu	Uv	Undervoltage	YES	*332*
uoF	voF	Output Voltage Detection Fault	YES	*332*

<1> Output when H2-□□ = 2F.
<2> Occurs in models CIMR-A□4A0930 and 4A1200.

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◼ Operation Errors

Table 6.12 Operation Error Displays

Digital Operator Display		Name	Page	Digital Operator Display		Name	Page
LED Operator	LCD Operator			LED Operator	LCD Operator		
oPE01	oPE01	Drive Unit Setting Error	*333*	*oPE09*	oPE09	PID Control Selection Error	*334*
oPE02	oPE02	Parameter Setting Range Error	*333*	*oPE10*	oPE10	V/f Data Setting Error	*335*
oPE03	oPE03	Multi-Function Input Setting Error	*333*	*oPE11*	oPE11	Carrier Frequency Setting Error	*335*
oPE04	oPE04	Terminal Board Mismatch Error	*334*	*oPE13*	oPE13	Pulse Train Monitor Selection Error	*335*
oPE05	oPE05	Run Command Selection Error	*334*	*oPE15*	oPE15	Torque Control Setting Error	*335*
oPE06	oPE06	Control Method Selection Error	*334*	*oPE16*	oPE16	Energy Saving Constants Error	*335*
oPE07	oPE07	Multi-Function Analog Input Selection Error	*334*	*oPE18*	oPE18	Online Tuning Parameter Setting Error	*335*
oPE08	oPE08	Parameter Selection Error	*334*	–	–	–	–

◼ Auto-Tuning Errors

Table 6.13 Auto-Tuning Error Displays

Digital Operator Display		Name	Page	Digital Operator Display		Name	Page
LED Operator	LCD Operator			LED Operator	LCD Operator		
End1	End1	Excessive V/f Setting	*336*	*Er-09*	Er-09	Acceleration Error	*337*
End2	End2	Motor Iron Core Saturation Coefficient Error	*336*	*Er-10*	Er-10	Motor Direction Error	*337*
End3	End3	Rated Current Setting Alarm	*336*	*Er-11*	Er-11	Motor Speed Error	*337*
End4	End4	Adjusted Slip Value Fell Below Lower Limit	*336*	*Er-12*	Er-12	Current Detection Error	*338*
End5	End5	Resistance Between Lines Error	*336*	*Er-13*	Er-13	Leakage Inductance Error	*338*
End6	End6	Leakage Inductance Alarm	*336*	*Er-14*	Er-14	Motor Speed Error 2	*338*
End7	End7	No-Load Current Alarm	*336*	*Er-15*	Er-15	Torque Saturation Error	*338*
Er-01	Er-01	Motor Data Error	*336*	*Er-16*	Er-16	Inertia ID Error	*338*
Er-02	Er-02	Alarm	*337*	*Er-17*	Er-17	Reverse Prohibited Error	*338*
Er-03	Er-03	STOP button Input	*337*	*Er-18*	Er-18	Induction Voltage Error	*338*
Er-04	Er-04	Line-to-Line Resistance Error	*337*	*Er-19*	Er-19	PM Inductance Error	*338*
Er-05	Er-05	No-Load Current Error	*337*	*Er-20*	Er-20	Stator Resistance Error	*338*
Er-08	Er-08	Rated Slip Error	*337*	*Er-21*	Er-21	Z Pulse Correction Error	*338*

◼ Errors and Displays When Using the Copy Function

Table 6.14 Copy Errors

Digital Operator Display		Name	Page
LED Operator	LCD Operator		
CoPY	CoPy	Writing parameter settings (flashing)	*339*
CPEr	CPEr	Control mode of the drive does not match	*339*
CPyE	CPyE	Error writing data	*339*
CSEr	CSEr	Error occurred in the copy function	*339*
dFPS	dFPS	Drive models do not match.	*339*
End	End	Task completed	*339*
iFEr	iFEr	Communication error	*339*
ndAT	ndAT	Model, voltage class, capacity, and/or control mode differ	*339*
rdEr	rdEr	Error reading data	*340*
rEAd	rEAd	Reading parameter settings (flashing)	*340*

Digital Operator Display		Name	Page
LED Operator	**LCD Operator**		
uAEr	vAEr	Voltage class and/or drive capacity does not match	*340*
uFyE	vFyE	Parameter settings in the drive and those saved to the copy function are not the same	*340*
urFy	vrFy	Comparing parameter settings (flashing)	*340*

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6.4 Fault Detection

◆ Fault Displays, Causes, and Possible Solutions

Faults are detected for drive protection, and cause the drive to stop. When a fault occurs, the fault output terminal MA-MB-MC is triggered. Faults have to be cleared manually after removing the cause to start running the drive again.

Table 6.15 Detailed Fault Displays, Causes, and Possible Solutions

Digital Operator Display		Fault Name
boL	boL	Braking Transistor Overload Fault
		The braking transistor has reached its overload level.
Cause		**Possible Solution**
The wrong braking resistor is installed.		• Select the optimal braking resistor.
Digital Operator Display		Fault Name
bUS	bUS	Option Communication Error
		• After establishing initial communication, the connection was lost. • Only detected when the run command frequency reference is assigned to an option card.
Cause		**Possible Solution**
No signal received from the PLC.		• Check for faulty wiring.
Faulty communications wiring or a short circuit exists.		• Correct the wiring. • Check for disconnected cables and short circuits. Repair as needed.
A communications data error occurred due to noise.		• Check the various options available to minimize the effects of noise. • Take steps to counteract noise in the control circuit, main circuit, and ground wiring. • Ensure that other equipment such as switches or relays do not cause noise. Use surge suppressors if necessary. • Use only recommended cables or other shielded line. Ground the shield on the controller side or on the drive input power side. • Separate all communication wiring from drive power lines. Install an EMC noise filter to the drive power supply input.
The option card is damaged.		• Replace the option card if there are no problems with the wiring and the error continues to occur.
The option card is not properly connected to the drive.		• The connector pins on the option card are not properly lined up with the connector pins on the drive. • Reinstall the option card.
Digital Operator Display		Fault Name
CE	CE	MEMOBUS/Modbus Communication Error
		Control data was not received for the CE detection time set to H5-09.
Cause		**Possible Solution**
Faulty communications wiring or a short circuit exists.		• Check for faulty wiring. • Correct the wiring. • Check for disconnected cables and short circuits. Repair as needed.
Communication data error occurred due to noise.		• Check the various options available to minimize the effects of noise. • Take steps to counteract noise in the control circuit, main circuit, and ground wiring. • Use only recommended cables or other shielded line. Ground the shield on the controller side or on the drive input power side. • Ensure that other equipment such as switches or relays do not cause noise and use surge suppressors if required. • Separate all communication wiring from drive power lines. Install an EMC noise filter to the drive power supply input.
Digital Operator Display		Fault Name
CF	CF	Control Fault
		A torque limit was reached continuously for three seconds or longer while ramping to stop in Open Loop Vector Control.
Cause		**Possible Solution**
Motor parameters are not set properly.		Check the motor parameter settings and repeat Auto-Tuning.
Torque limit is too low.		Set the torque limit to the most appropriate setting (L7-01 through L7-04).
Load inertia is too big.		• Adjust the deceleration time (C1-02, -04, -06, -08). • Set the frequency to the minimum value and interrupt the Run command when the drive finishes decelerating.
Digital Operator Display		Fault Name
CPF00 or *CPF01* <1>	CPF00 or CPF01 <1>	Control Circuit Error
Cause		**Possible Solution**
There is a self diagnostic error in control circuit.		• Cycle power to the drive. • If the problem continues, replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.
Connector on the operator is damaged.		• Replace the operator.
Digital Operator Display		Fault Name
CPF02	CPF02	A/D Conversion Error
		An A/D conversion error or control circuit error occurred.
Cause		**Possible Solution**
Control circuit is damaged.		• Cycle power to the drive. • If the problem continues, replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.

Digital Operator Display		Fault Name
$CPF03$	CPF03	Control Board Connection Error
		Connection error between the control board and the drive
Cause		**Possible Solution**
There is a connection error.		• Turn the power off and check the connection between the control board and the drive. • If the problem continues, replace either the control board or the entire drive.
Drive fails to operate properly due to noise interference.		• Check the various options available to minimize the effects of noise. • Take steps to counteract noise in the control circuit, main circuit, and ground wiring. • Use only recommended cables or other shielded line. Ground the shield on the controller side or on the drive input power side. • Ensure that other equipment such as switches or relays do not cause noise and use surge suppressors if required. • Separate all communication wiring from drive power lines. Install an EMC noise filter to the drive power supply input.
Digital Operator Display		Fault Name
$CPF06$	CPF06	EEPROM Memory Data Error
		There is an error in the data saved to EEPROM.
Cause		**Possible Solution**
There is an error in EEPROM control circuit.		• Turn the power off and check the connection between the control board and the drive. • If the problem continues, replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.
The power supply was switched off when parameters were being saved to the drive.		Reinitialize the drive (A1-03).
Digital Operator Display		Fault Name
$CPF07$	CPF07	Terminal Board Connection Error
$CPF08$	CPF08	
Cause		**Possible Solution**
There is a fault connection between the terminal board and control board.		• Turn the power off and reconnect the control circuit terminal board. • If the problem continues, replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.
Digital Operator Display		Fault Name
$CPF20$ or $CPF21$ <1>	CPF20 or CPF21	Control Circuit Error
Cause		**Possible Solution**
Hardware is damaged.		• Cycle power to the drive. • If the problem continues, replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.
Digital Operator Display		Fault Name
$CPF22$	CPF22	Hybrid IC Error
Cause		**Possible Solution**
Hybrid IC on the main circuit is damaged.		• Cycle power to the drive. ***Refer to Diagnosing and Resetting Faults on page 341***. • If the problem continues, replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.
Digital Operator Display		Fault Name
$CPF23$	CPF23	Control Board Connection Error
		Connection error between the control board and the drive
Cause		**Possible Solution**
Hardware is damaged.		• Turn the power off and check the connection between the control board and the drive. • If the problem continues, replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.
Digital Operator Display		Fault Name
$CPF24$	CPF24	Drive Unit Signal Fault
		The drive capacity cannot be detected correctly (drive capacity is checked when the drive is powered up).
Cause		**Possible Solution**
Hardware is damaged.		Replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.
Digital Operator Display		Fault Name
$CPF26$ to $CPF34$, $CPF40$ to $CPF45$ <2>	CPF26 to CPF34, CPF40 to CPF45	Control Circuit Error
		CPU error
Cause		**Possible Solution**
Hardware is damaged.		Replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.

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Digital Operator Display		Fault Name
dEu	dEv	Speed Deviation (for Control Mode with PG)
		The deviation between the speed reference and speed feedback is greater than the setting in F1-10 for longer than the time set to F1-11.
Cause		**Possible Solution**
Load is too heavy.		Reduce the load.
Acceleration and deceleration times are set too short.		Increase the acceleration and deceleration times (C1-01 through C1-08).
The load is locked up.		Check the machine.
Parameters are not set appropriately.		Check the settings of parameters F1-10 and F1-11.
Incorrect speed feedback scaling if terminal RP is used as speed feedback input in V/f control.		• Set H6-02 to the same value as the speed feedback signal frequency when the motor runs at maximum speed. • Adjust the speed feedback signal using parameters H6-03 through H6-05. • Make sure the speed feedback signal frequency does not exceed the maximum input frequency of terminal RP.
Motor brake engaged.		Ensure the motor brake releases properly.
Digital Operator Display		**Fault Name**
$du\,l$	dv1	Z Pulse Fault
		The motor turned one full rotation without the Z pulse being detected.
Cause		**Possible Solution**
PG encoder is not connected, not wired properly, or is damaged.		• Make sure the PG encoder is properly connected and all shielded lines are properly grounded. • If the problem continues after cycling power, then replace either the PG option card or the PG encoder itself.
Digital Operator Display		**Fault Name**
$du2$	dv2	Z Pulse Noise Fault Detection
		The Z pulse is out of phase by more than 5 degrees for the number of times specified in parameter F1-17.
Cause		**Possible Solution**
Noise interference along the PG cable.		Separate the PG cable lines from the source of the noise (very possibly drive output wiring).
PG cable is not wired properly.		Rewire the PG encoder and make sure all shielded lines are properly grounded.
PG option card or the PG encoder is damaged.		If the problem continues after cycling power, then replace either the PG option card or the PG encoder itself.
Digital Operator Display		**Fault Name**
$du3$	dv3	Inversion Detection
		The torque reference and acceleration are in opposite directions from one another (one is in reverse and the other is forward) while at the same time the speed reference and actual motor speed differ by over 30% for the number of pulses set to F1-18.
Cause		**Possible Solution**
The Z pulse offset is not set properly to E5-11.		Set the value for Δθ to E5-11 as specified on the motor nameplate. Replacing the PG encoder or changing the application so that the motor rotates in reverse instead requires readjustment of the Z pulse offset.
An external force on the load side has caused the motor to move.		• Make sure the motor is rotating in the right direction. • Look for any problems on the load side that might be causing the motor to rotate in the opposite direction.
Noise interference along the PG cable affecting the A or B pulse.		Rewire the PG encoder and make sure all lines including shielded line are properly connected.
PG encoder is disconnected, not wired properly, or the PG option card or PG itself is damaged.		
Rotational direction for the PG encoder set to F1-05 is the opposite of the order of the motor lines.		Make sure motor lines for each phase (U, V, W) are connected properly.
Digital Operator Display		**Fault Name**
$du4$	dv4	Inversion Prevention Detection
		Pulses indicate that the motor is rotating in the opposite direction of the speed reference. Set the number of pulses to trigger inverse detection to F1-19. **Note:** Disable inverse detection in applications where the motor may rotate in the opposite direction of the speed reference. Setting F1-19 to 0 disables this feature.
Cause		**Possible Solution**
The Z pulse offset is not set properly to E5-11.		• Set the value for Δθ to E5-11 as specified on the motor nameplate. • If the problem continues after cycling power, then replace either the PG option card or the PG encoder itself. Replacing the PG encoder or changing the application so that the motor rotates in reverse instead requires readjustment of the Z-pulse offset.
Noise interference along the PG cable affecting the A or B pulse.		• Make sure the motor is rotating in the correct direction. • Look for any problems on the load side that might be causing the motor to rotate in the opposite direction.
PG encoder is disconnected, not wired properly, or the PG option card or PG itself is damaged.		• Rewire the PG encoder and make sure all lines including shielded line are properly connected. • If the problem continues after cycling power, then replace either the PG option card or the PG encoder itself.
Digital Operator Display		**Fault Name**
$du7$ [3] [4]	dv7	Polarity Judge Timeout
Cause		**Possible Solution**
Disconnection in the motor coil winding.		• Measure the motor line-to-line resistance and replace the motor if the motor coil winding is disconnected.
Loose output terminals.		• Check for loose terminals. Apply the tightening torque specified in this manual to fasten the terminals. Refer to *Wire Size on page 77*.
Digital Operator Display		**Fault Name**
$duUAL$	dWAL	DriveWorksEZ Fault
$duUFL$	dWFL	
Cause		**Possible Solution**
Fault output by DriveWorksEZ		• Correct whatever caused the fault.

Digital Operator Display		Fault Name
E5	E5	SI-T3 Watchdog Timer Error
		The watchdog has timed out.
Cause		**Possible Solution**
Data has not been received from the PLC, triggering the watchdog timer.		⇒ Execute DISCONNECT or ALM_CLR, then issue a CONNECT command or SYNC_SET command and proceed to phase 3.

Digital Operator Display		Fault Name
EF0	EF0	Option Card External Fault
		An external fault condition is present.
Cause		**Possible Solution**
An external fault was received from the PLC with other than F6-03 = 3 "alarm only" (the drive continued to run after external fault).		• Remove the cause of the external fault. • Remove the external fault input from the PLC.
Problem with the PLC program.		Check the PLC program and correct problems.

Digital Operator Display		Fault Name
EF1	EF1	External Fault (input terminal S1)
		External fault at multi-function input terminal S1.
EF2	EF2	External Fault (input terminal S2)
		External fault at multi-function input terminal S2.
EF3	EF3	External Fault (input terminal S3)
		External fault at multi-function input terminal S3.
EF4	EF4	External Fault (input terminal S4)
		External fault at multi-function input terminal S4.
EF5	EF5	External Fault (input terminal S5)
		External fault at multi-function input terminal S5.
EF6	EF6	External Fault (input terminal S6)
		External fault at multi-function input terminal S6.
EF7	EF7	External Fault (input terminal S7)
		External fault at multi-function input terminal S7
EF8	EF8	External Fault (input terminal S8)
		External fault at multi-function input terminal S8
Cause		**Possible Solution**
An external device has tripped an alarm function.		Remove the cause of the external fault and reset the fault.
Wiring is incorrect.		• Ensure the signal lines have been connected properly to the terminals assigned for external fault detection (H1-□□ = 20 to 2F). • Reconnect the signal line.
Incorrect setting of multi-function contact inputs.		• Check if the any unused terminals are set for H1-□□ = 20 to 2F (External Fault). • Change the terminal settings.

Digital Operator Display		Fault Name
Err	Err	EEPROM Write Error
		Data cannot be written to the EEPROM.
Cause		**Possible Solution**
Noise has corrupted data while writing to the EEPROM.		• Press the [ENTER] button. • Correct the parameter setting. • Cycle power to the drive. *Refer to Diagnosing and Resetting Faults on page 341*. • Replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.
Hardware problem.		• Replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.

Digital Operator Display		Fault Name
FAn	FAn	Internal Fan Fault
		Fan or magnetic contactor failed.
Cause		**Possible Solution**
Internal cooling fan has malfunctioned (models 2A0360, 2A0415, 4A0362 to 4A1200).		Cycle power to the drive and see if the fault is still present. Check if the fan is operating or not. Verify the cumulative operation time of the fan using monitor U4-03, and the fan maintenance timer in U4-04. If the cooling fan has passed its expected performance life or is damaged in some way, follow the instructions in this manual to replace it.
Fault detected in the internal cooling fan or magnetic contactor to the power supply (models 2A0250 to 2A0415, 4A0165 to 4A1200).		Cycle power to the drive and see if the fault is still present. If the fault still occurs, either replace the control circuit board or the entire unit. For instructions on replacing the power board, contact the Yaskawa sales office directly or your nearest Yaskawa representative.

Digital Operator Display		Fault Name
FbH	FbH	Excessive PID Feedback
		PID feedback input is greater than the level set b5-36 for longer than the time set to b5-37. To enable fault detection, set b5-12 = 2 or 5.
Cause		**Possible Solution**
Parameters are not set appropriately.		Check the settings of parameters b5-36 and b5-37.
Wiring for PID feedback is incorrect.		Correct the wiring.
There is a problem with the feedback sensor.		• Check the sensor on the control side. • Replace the sensor if damaged.

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Digital Operator Display		Fault Name
FbL	FbL	PID Feedback Loss
		This fault occurs when PID feedback loss detection is programmed to trigger a fault (b5-12 = 2) and the PID feedback level is below the detection level set to b5-13 for longer than the time set to b5-14.
Cause		**Possible Solution**
Parameters are not set appropriately.		Check the settings of parameters b5-13 and b5-14.
Wiring for PID feedback is incorrect.		Correct the wiring.
There is a problem with the feedback sensor.		Check the sensor on the controller side. If damaged, replace the sensor.

Digital Operator Display		Fault Name
GF	GF	Ground Fault
		• A current short to ground exceeded 50% of rated current on the output side of the drive. • Setting L8-09 to 1 enables ground fault detection in models 2A0030 through 2A0415 and 4A0018 through 4A1200.
Cause		**Possible Solution**
Motor insulation is damaged.		• Check the insulation resistance of the motor. • Replace the motor.
A damaged motor cable is creating a short circuit.		• Check the motor cable. • Remove the short circuit and turn the power back on.
		• Check the resistance between the cable and the ground terminal ⏚. • Replace the cable.
The leakage current at the drive output is too high.		• Reduce the carrier frequency. • Reduce the amount of stray capacitance.
The drive started to run during a current offset fault or while coasting to a stop.		• The value set exceeds the allowable setting range while the drive automatically adjusts the current offset (this happens only when attempting to restart a PM motor that is coasting to stop). • Enable Speed Search at start (b3-01 = 1). • Perform Speed Search 1 or 2 (H1-□□ = 61 or 62) via one of the external terminals. **Note:** Speed Search 1 and 2 are the same when using PM OLV.
Hardware problem.		Replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.

Digital Operator Display		Fault Name
LF	LF	Output Phase Loss
		• Phase loss on the output side of the drive. • Phase Loss Detection is enabled when L8-07 is set to 1 or 2.
Cause		**Possible Solution**
The output cable is disconnected.		• Check for wiring errors and ensure the output cable is connected properly. • Correct the wiring.
The motor winding is damaged.		• Check the resistance between motor lines. • Replace the motor if the winding is damaged.
The output terminal is loose.		• Apply the tightening torque specified in this manual to fasten the terminals. *Refer to Wire Size on page 77*.
The rated current of the motor being used is less than 5% of the drive rated current.		Check the drive and motor capacities.
An output transistor is damaged.		Replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.
A single-phase motor is being used.		The drive cannot operate a single phase motor.

Digital Operator Display		Fault Name
LF2	LF2	Output current imbalance (detected when L8-29 = 1)
		One or more of the phases in the output current is lost.
Cause		**Possible Solution**
Phase loss has occurred on the output side of the drive.		• Check for faulty wiring or poor connections on the output side of the drive. • Correct the wiring.
Terminal wires on the output side of the drive are loose.		Apply the tightening torque specified in this manual to fasten the terminals. *Refer to Wire Size on page 77*.
The output circuit is damaged.		Replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.
Motor impedance or motor phases are uneven.		• Measure the line-to-line resistance for each motor phase. Ensure all values are the same. • Replace the motor.

Digital Operator Display		Fault Name
LF3 <2>	LF3	Power Unit Output Phase Loss 3
		Phase loss occurred on the output side (L8-78 is enabled).
Cause		**Possible Solution**
The gate drive board in the power unit is damaged.		Cycle the power supply. Refer to *Diagnosing and Resetting Faults on page 341* for instructions. If the fault continues to occur, replace the gate drive board or the drive.
The current detection circuit in the power unit is damaged.		Check for any incorrect wiring. Correct any wiring mistakes.
Cable to the current detection circuit in the power unit is not connected properly.		
Cable between the output reactor and the power unit is not connected.		Contact Yaskawa or your nearest sales representative for instructions.
Cable between the output reactor and the power unit is loose.		

Digital Operator Display		Fault Name
nSE	nSE	Node Setup Error
		A terminal assigned to the node setup function closed during run.

Cause	Possible Solution
The node setup terminal closed during run.	Stop the drive when using the node setup function.
A run command was issued while the node setup function was active.	

Digital Operator Display		Fault Name
oC	oC	Overcurrent
		Drive sensors have detected an output current greater than the specified overcurrent level.

Cause	Possible Solution
The motor has been damaged due to overheating or the motor insulation is damaged.	• Check the insulation resistance. • Replace the motor.
One of the motor cables has shorted out or there is a grounding problem.	• Check the motor cables. • Remove the short circuit and power the drive back up. • Check the resistance between the motor cables and the ground terminal ⏚. • Replace damaged cables.
The load is too heavy.	• Measure the current flowing into the motor. • Replace the drive with a larger capacity unit if the current value exceeds the rated current of the drive. • Determine if there is sudden fluctuation in the current level. • Reduce the load to avoid sudden changes in the current level or switch to a larger drive.
The acceleration or deceleration times are too short.	Calculate the torque needed during acceleration relative to the load inertia and the specified acceleration time. If the right amount of torque cannot be set, make the following changes: • Increase the acceleration time (C1-01, -03, -05, -07) • Increase the S-curve characteristics (C2-01 through C2-04) • Increase the capacity of the drive.
The drive is attempting to operate a specialized motor or a motor larger than the maximum size allowed.	• Check the motor capacity. • Ensure that the rated capacity of the drive is greater than or equal to the capacity rating found on the motor nameplate.
Magnetic contactor (MC) on the output side of the drive has turned on or off.	Set up the operation sequence so that the MC is not tripped while the drive is outputting current.
V/f setting is not operating as expected.	• Check the ratios between the voltage and frequency. • Set parameter E1-04 through E1-10 appropriately (E3-04 through E3-10 for motor 2). • Lower the voltage if it is too high relative to the frequency.
Excessive torque compensation.	• Check the amount of torque compensation. • Reduce the torque compensation gain (C4-01) until there is no speed loss and less current.
Drive fails to operate properly due to noise interference.	• Review the possible solutions provided for handling noise interference. • Review the section on handling noise interference and check the control circuit lines, main circuit lines, and ground wiring.
Overexcitation gain is set too high.	• Check if fault occurs simultaneously to overexcitation function operation. • Consider motor flux saturation and reduce the value of n3-13 (Overexcitation Deceleration Gain).
Run command applied while motor was coasting.	• Enable Speed Search at start (b3-01 = 1). • Program the Speed Search command input through one of the multi-function contact input terminals (H1-□□ = 61 or 62).
The wrong motor code has been entered for PM Open Loop Vector (Yaskawa motors only) or the motor data are wrong.	• Enter the correct motor code to E5-01. • If a non-Yaskawa PM motor is used, enter "FFFF" to E5-01. Set the correct motor data to the E5-□□ parameters or perform Auto-Tuning.
The motor control method and motor do not match.	• Check which motor control method the drive is set to (A1-02). • For IM motors, set A1-02 = "0", "1", "2", or "3". • For PM motors, set A1-02 = "5", "6" or "7".
The drives rated output current is too small.	Use a larger drive.

Digital Operator Display		Fault Name
oFA00	oFA00	Option Card Connection Error at Option Port CN5-A
		Option compatibility error

Cause	Possible Solution
The option card installed into port CN5-A is incompatible with the drive.	Check if the drive supports the option card that you are attempting to install. Contact Yaskawa for assistance.
A PG option card is connected to option port CN5-A	PG option boards are supported by option ports CN5-B and CN5-C only. Place the PG option card into the correct option port.

Digital Operator Display		Fault Name
oFA01	oFA01	Option Card Fault at Option Port CN5-A
		Option not properly connected

Cause	Possible Solution
The option board connection to port CN5-A is faulty.	• Turn the power off and reconnect the option card. • Check if the option card is properly plugged into the option port. Make sure the card is fixed properly. • If the option is not a communication option card, try to use the card in another option port. If it works there, replace the drive. If the error persists (oFb01 or oFC01 occur), replace the option board.

Digital Operator Display		Fault Name
oFA03 to oFA06	oFA03 to oFA06	Option card error occurred at option port CN5-A
oFA10, oFA11	oFA10, oFA11	
oFA12 to oFA17	oFA12 to oFA17	Option Card Connection Error (CN5-A)
oFA30 to oFA43	oFA30 to oFA43	Comm. Option Card Connection Error (CN5-A)

Cause	Possible Solution
Option card or hardware is damaged.	• Cycle power to the drive. • If the problem continues, replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.

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Digital Operator Display		Fault Name
oFb00	oFb00	Option Card Fault at Option Port CN5-B
		Option compatibility error

Cause	Possible Solution
The option card installed into port CN5-B is incompatible with the drive.	Check if the drive supports the option card that you are attempting to install. Contact Yaskawa for assistance.
A communication option card has been installed in option port CN5-B.	Communication option cards are supported by option port CN5-A only. More than one comm. option cannot be installed.

Digital Operator Display		Fault Name
oFb01	oFb01	Option Card Fault at Option Port CN5-B
		Option not properly connected

Cause	Possible Solution
The option board connection to port CN5-B is faulty.	• Turn the power off and reconnect the option card. • Check if the option card is properly plugged into the option port. Make sure the card is fixed properly. • Try to use the card in another option port (in case of a PG option use port CN5-C). If option card still doesn't work there, replace the drive. If the error persists (oFA01 or oFC01 occur), replace the option board.

Digital Operator Display		Fault Name
oFb02	oFb02	Option Card Fault at Option Port CN5-B
		Same type of option card already connected

Cause	Possible Solution
An option card of the same type is already installed in option port CN5-A.	Except for PG options, each option card type can only be installed once. Make sure only one type of option card is connected.
An input option card is already installed in option port CN5-A.	Make sure that a comm. option, a digital input option, or an analog input option is installed. The same type of card cannot be installed twice.

Digital Operator Display		Fault Name
oFb03 to oFb11	oFb03 to oFb11	Option card error occurred at Option Port CN5-B
oFb12 to oFb17	oFb12 to oFb17	

Cause	Possible Solution
Option card or hardware is damaged.	• Cycle power to the drive. • If the problem continues, replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.

Digital Operator Display		Fault Name
oFC00	oFC00	Option Card Connection Error at Option Port CN5-C
		Option compatibility error

Cause	Possible Solution
The option card installed into port CN5-C is incompatible with the drive.	Check if the drive supports the option card that you are attempting to instal. Contact Yaskawa for assistance.
A communication option card has been installed in option port CN5-C.	Communication option cards are supported by option port CN5-A only. More than one comm. option cannot be installed.

Digital Operator Display		Fault Name
oFC01	oFC01	Option Card Fault at Option Port CN5-C
		Option not properly connected

Cause	Possible Solution
The option board connection to port CN5-C is faulty.	• Turn the power off and reconnect the option card. • Check if the option card is properly plugged into the option port. Make sure the card is fixed properly. • Try to use the card in another option port (in case of a PG option use port CN5-B). If it works there, replace the drive. If the error persists (oFA01 or oFb01 occur), replace the option board.

Digital Operator Display		Fault Name
oFC02	oFC02	Option Card Fault at Option Port CN5-C
		Same type of option card already connected

Cause	Possible Solution
An option card of the same type is already installed in option port CN5-A or CN5-B.	Except for PG options, each option card type can only be installed once. Make sure only one type of option card is connected.
An input option card is already installed in option port CN5-A or CN5-B.	Make sure that a comm. option, a digital input option, or an analog input option is installed. The same type of card cannot be installed twice.
Three PG option boards are installed.	Maximum two PG option boards can be used at the same time. Remove the PG option board installed into option port CN5-A.

Digital Operator Display		Fault Name
oFC03 to oFC11	oFC03 to oFC11	Option card error occurred at option port CN5-C
oFC12 to oFC17	oFC12 to oFC17	

Cause	Possible Solution
Option card or hardware is damaged.	• Cycle power to the drive. • If the problem continues, replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.

Digital Operator Display		Fault Name
oH	oH	Heatsink Overheat
		The temperature of the heatsink exceeded the overheat pre-alarm level set to L8-02. Default value for L8-02 is determined by drive capacity (o2-04).
Cause		**Possible Solution**
Surrounding temperature is too high.		• Check the temperature surrounding the drive. Verify temperature is within drive specifications. • Improve the air circulation within the enclosure panel. • Install a fan or air conditioner to cool the surrounding area. • Remove anything near the drive that might be producing excessive heat.
Load is too heavy.		• Measure the output current. • Decrease the load. • Lower the carrier frequency (C6-02).
Internal cooling fan is stopped.		• Replace the cooling fan. *Refer to Cooling Fan Component Names on page 360*. • After replacing the drive, reset the cooling fan maintenance parameter (o4-03 = 0).
Digital Operator Display		**Fault Name**
oH1	oH1	Overheat 1 (Heatsink Overheat)
		The temperature of the heatsink exceeded the drive overheat level. The overheat level is determined by drive capacity (o2-04).
Cause		**Possible Solution**
Surrounding temperature is too high.		• Check the temperature surrounding the drive. • Improve the air circulation within the enclosure panel. • Install a fan or air conditioner to cool the surrounding area. • Remove anything near the drive that might be producing excessive heat.
Load is too heavy.		• Measure the output current. • Lower the carrier frequency (C6-02). • Reduce the load.
Digital Operator Display		**Fault Name**
oH3	oH3	Motor Overheat Alarm (PTC Input)
		• The motor overheat signal to analog input terminal A1, A2, or A3 exceeded the alarm detection level. • Detection requires multi-function analog input H3-02, H3-06, or H3-10 be set to "E".
Cause		**Possible Solution**
Motor has overheated		• Check the size of the load, the accel/decel times, and the cycle times. • Decrease the load. • Increase the acceleration and deceleration times (C1-01 through C1-08).
		• Adjust the preset V/f pattern (E1-04 through E1-10). This will mainly involve reducing E1-08 and E1-10. • Be careful not to lower E1-08 and E1-10 too much, as this reduces load tolerance at low speeds.
		• Check the motor rated current. • Enter the motor rated current as indicated on the motor nameplate (E2-01). • Ensure the motor cooling system is operating normally. • Repair or replace the motor cooling system.
Digital Operator Display		**Fault Name**
oH4	oH4	Motor Overheat Fault (PTC Input)
		• The motor overheat signal to analog input terminal A1, A2, or A3 exceeded the fault detection level. • Detection requires that multi-function analog input H3-02, H3-06, or H3-10 = "E".
Cause		**Possible Solution**
Motor has overheated.		• Check the size of the load, the accel/decel times, and the cycle times. • Decrease the load. • Increase the acceleration and deceleration times (C1-01 through C1-08).
		• Adjust the preset V/f pattern (E1-04 through E1-10). This will mainly involve reducing E1-08 and E1-10. Be careful not to lower E1-08 and E1-10 too much because this reduces load tolerance at low speeds.
		• Check the motor rated current. • Enter the motor rated current as indicated on the motor nameplate (E2-01). • Ensure the motor cooling system is operating normally. • Repair or replace the motor cooling system.
Digital Operator Display		**Fault Name**
oH5 *<2>*	oH5	Motor Overheat (NTC Input)
		The motor temperature exceeded the level set in L1-16 (or L1-18 for motor 2).
Cause		**Possible Solution**
Motor has overheated.		• Reduce the load. • Check the ambient temperature.

Digital Operator Display		Fault Name
oL1	oL1	Motor Overload
		The electronic motor overload protection tripped.
Cause		**Possible Solution**
Load is too heavy.		Reduce the load.
Cycle times are too short during acceleration and deceleration.		Increase the acceleration and deceleration times (C1-01 through C1-08).
A general purpose motor is driven below the rated speed with too high load.		• Reduce the load. • Increase the speed. • If the motor is supposed to operate at low speeds, either increase the motor capacity or use a motor specifically designed to operate in the desired speed range.
The output voltage is too high.		Adjust the user-set V/f patterns (E1-04 through E1-10). Parameters E1-08 and E1-10 may need to be reduced. Be careful not to lower E1-08 and E1-10 too much because this reduces load tolerance at low speeds.
The wrong motor rated current is set to E2-01.		• Check the motor-rated current. • Enter the value written on the motor nameplate to parameter E2-01.
The maximum output frequency is set incorrectly.		• Check the rated frequency indicated on the motor nameplate. • Enter the rated frequency to E1-06 (Base Frequency).
Multiple motors are running off the same drive.		Disable the motor protection function (L1-01 = 0) and install a thermal relay to each motor.
The electrical thermal protection characteristics and motor overload characteristics do not match.		• Check the motor characteristics. • Correct the type of motor protection that has been selected (L1-01). • Install an external thermal relay.
The electrical thermal relay is operating at the wrong level.		• Check the current rating listed on the motor nameplate. • Check the value set for the motor rated current (E2-01).
Motor overheated by overexcitation operation.		• Overexcitation increases the motor losses and the motor temperature. If applied too long, motor damage can occur. Prevent excessive overexcitation operation or apply proper cooling to the motor. • Reduce the excitation deceleration gain (n3-13). • Set L3-04 (Stall Prevention during Deceleration) to a value other than 4.
Speed Search related parameters are set incorrectly.		• Check values set to Speed Search related parameters. • Adjust the Speed Search current and Speed Search deceleration times (b3-02 and b3-03 respectively). • After Auto-Tuning, enable Speed Estimation Speed Search (b3-24 = 1).
Output current fluctuation due to input phase loss		Check the power supply for phase loss.
Digital Operator Display		Fault Name
oL2	oL2	Drive Overload
		The thermal sensor of the drive triggered overload protection.
Cause		**Possible Solution**
Load is too heavy.		Reduce the load.
Acceleration or deceleration times are too short.		Increase the settings for the acceleration and deceleration times (C1-01 through C1-08).
The output voltage is too high.		• Adjust the preset V/f pattern (E1-04 through E1-10). This will mainly involve reducing E1-08 and E1-10. • Be careful not to lower E1-08 and E1-10 excessively because this reduces load tolerance at low speeds.
Drive capacity is too small.		Replace the drive with a larger model.
Overload occurred when operating at low speeds.		• Reduce the load when operating at low speeds. • Replace the drive with a model that is one frame size larger. • Lower the carrier frequency (C6-02).
Excessive torque compensation.		Reduce the torque compensation gain (C4-01) until there is no speed loss but less current.
Speed Search related parameters are set incorrectly.		• Check the settings for all Speed Search related parameters. • Adjust the current used during Speed Search and the Speed Search deceleration time (b3-03 and b3-02 respectively). • After Auto-Tuning the drive, enable the Speed Estimation Speed Search (b3-24 = 1).
Output current fluctuation due to input phase loss		Check the power supply for phase loss.
Digital Operator Display		Fault Name
oL3	oL3	Overtorque Detection 1
		The current has exceeded the value set for torque detection (L6-02) for longer than the allowable time (L6-03).
Cause		**Possible Solution**
Parameter settings are not appropriate for the load.		Check the settings of parameters L6-02 and L6-03.
Fault on the machine side (e.g., machine is locked up).		Check the status of the load. Remove the cause of the fault.
Digital Operator Display		Fault Name
oL4	oL4	Overtorque Detection 2
		The current has exceeded the value set for Overtorque Detection 2 (L6-05) for longer than the allowable time (L6-06).
Cause		**Possible Solution**
Parameter settings are not appropriate for the load.		Check the settings of parameters L6-05 and L6-06.
Digital Operator Display		Fault Name
oL5	oL5	Mechanical Weakening Detection 1
		Overtorque occurred, matching the conditions specified in L6-08.
Cause		**Possible Solution**
Overtorque triggered mechanical weakening detection level set to L6-08.		Check for the cause of mechanical weakening.

Digital Operator Display		Fault Name
oL η	oL7	High Slip Braking oL
		The output frequency stayed constant for longer than the time set in n3-04 during High Slip Braking.
Cause		**Possible Solution**
Excessive load inertia.		• Reduce deceleration times in parameters C1-02, C1-04, C1-06, and C1-08 for applications that do not use High Slip Braking. • Use a braking resistor to shorten deceleration time.
Motor is driven by the load.		
Something on the load side is restricting deceleration.		
The overload time during High Slip Braking is too short.		• Increase parameter n3-04 (High-slip Braking Overload Time). • Install a thermal relay and increase the setting of n3-04 to the maximum value.

Digital Operator Display		Fault Name
oP_r	oPr	External Digital Operator Connection Fault
		• The external operator has been disconnected from the drive. **Note:** An oPr fault will occur when all of the following conditions are true: • Output is interrupted when the operator is disconnected (o2-06 = 1). • The Run command is assigned to the operator (b1-02 = 0 and LOCAL has been selected).
Cause		**Possible Solution**
External operator is not properly connected to the drive.		• Check the connection between the operator and the drive. • Replace the cable if damaged. • Turn off the drive input power and disconnect the operator. Next reconnect the operator and turn the drive input power back on.

Digital Operator Display		Fault Name
$o5$	oS	Overspeed (for Control Mode with PG)
		The motor speed feedback exceeded the F1-08 setting.
Cause		**Possible Solution**
Overshoot is occurring.		• Increase the settings for C5-01 (Speed Control Proportional Gain 1) and reduce C5-02 (Speed Control Integral Time 1). • If using a Closed Loop Vector mode, enable Feed Forward and perform Inertia Auto-Tuning.
Incorrect speed feedback scaling if terminal RP is used as speed feedback input in V/f control.		• Set H6-02 to the value of the speed feedback signal frequency when the motor runs at the maximum speed. • Adjust the input signal using parameters H6-03 through H6-05.
Incorrect number of PG pulses has been set.		• Check and correct parameter F1-01.
Inappropriate parameter settings.		Check the setting for the overspeed detection level and the overspeed detection time (F1-08 and F1-09).

Digital Operator Display		Fault Name
ou	ov	Overvoltage
		Voltage in the DC bus has exceeded the overvoltage detection level. • For 200 V class: approximately 410 V • For 400 V class: approximately 820 V
Cause		**Possible Solution**
Deceleration time is too short and regenerative energy is flowing from the motor into the drive.		• Increase the deceleration time (C1-02, C1-04, C1-06, C1-08). • Install a dynamic braking option. • Enable stall prevention during deceleration (L3-04 = 1). Stall Prevention is enabled as the default setting.
Fast acceleration time causes the motor to overshoot the speed reference.		• Check if sudden drive acceleration triggers an overvoltage alarm. • Increase the acceleration time. • Use longer S-curve acceleration and deceleration times. • Enable the Overvoltage Suppression function (L3-11 = 1). • Lengthen the S-curve at acceleration end.
Excessive braking load.		The braking torque was too high, causing regenerative energy to charge the DC bus. Reduce the braking torque, use a dynamic braking option, or lengthen decel time.
Surge voltage entering from the drive input power.		Install a DC reactor. **Note:** Voltage surge can result from a thyristor convertor and phase advancing capacitor using the same input power supply.
Ground fault in the output circuit causing the DC bus capacitor to overcharge.		• Check the motor wiring for ground faults. • Correct grounding shorts and turn the power back on.
Improper Setting of Speed Search related parameters. (Includes Speed Search after a momentary power loss and after a fault restart.)		• Check the settings for Speed Search-related parameters. • Enable Speed Search restart function (b3-19 greater than or equal to 1 to 10). • Adjust the current level during Speed Search and the deceleration time (b3-02 and b3-03 respectively). • Perform Stationary Auto-Tuning for line-to-line resistance and then enable Speed Estimation Speed Search (b3-24 = 1).
Drive input power voltage is too high.		• Check the voltage. • Lower drive input power voltage within the limits listed in the specifications.
The braking transistor is wired incorrectly.		• Check braking transistor wiring for errors. • Properly rewire the braking resistor device.
PG cable is disconnected.		Reconnect the cable.
PG cable wiring is wrong.		Correct the wiring.
Noise interference along the PG encoder wiring.		Separate the wiring from the source of the noise (often the output lines from the drive).
Drive fails to operate properly due to noise interference.		• Review the list of possible solutions provided for controlling noise. • Review the section on handling noise interference and check the control circuit lines, main circuit lines, and ground wiring.
Load inertia has been set incorrectly.		• Check the load inertia settings when using KEB, overvoltage suppression, or Stall Prevention during deceleration. • Adjust the load inertia ratio in L3-25 to better match the load.
Braking function is being used in OLV/PM.		Connect a braking resistor.
Motor hunting occurs.		• Adjust the parameters that control hunting. • Set the gain for Hunting Prevention (n1-02). • Adjust the AFR time constant (n2-02 and n2-03). • Adjust the speed feedback detection suppression gain for PM motors (n8-45) and the time constant for pull-in current (n8-47).

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Digital Operator Display		Fault Name
PF	PF	Input Phase Loss
		Drive input power has an open phase or has a large imbalance of voltage between phases. Detected when L8-05 = 1 (enabled).

Cause	Possible Solution
There is phase loss in the drive input power.	• Check for wiring errors in the main circuit drive input power. • Correct the wiring.
There is loose wiring in the drive input power terminals.	• Ensure the terminals are tightened properly. • Apply the tightening torque as specified in this manual. *Refer to Wire Gauges and Tightening Torque on page 68*
There is excessive fluctuation in the drive input power voltage.	• Check the voltage from the drive input power. • Review the possible solutions for stabilizing the drive input power.
There is poor balance between voltage phases.	• Stabilize drive input power or disable phase loss detection.
The main circuit capacitors are worn.	• Check the maintenance time for the capacitors (U4-05). • Replace the capacitor if U4-05 is greater than 90%. For instructions on replacing the capacitor, contact Yaskawa or your nearest sales representative.
	Check for anything problems with the drive input power. If drive input power appears normal but the alarm continues to occur, replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.

Digital Operator Display		Fault Name
PGo	PGo	PG Disconnect (for any control modes using a PG option card)
		No PG pulses are received for longer than the time set to F1-14.

Cause	Possible Solution
PG cable is disconnected.	Reconnect the cable.
PG cable wiring is wrong.	Correct the wiring.
PG has no power.	Check the power line to the PG encoder.
PG encoder brake is clamped shut.	Ensure the motor brake releases properly.

Digital Operator Display		Fault Name
$PGoH$	PGoH	PG Hardware Fault (detected when using a PG-X3 option card)
		PG cable is not connected properly.

Cause	Possible Solution
PG cable is disconnected.	Reconnect the cable. Check the setting of F1-20.

Digital Operator Display		Fault Name
rF	rF	Braking Resistor Fault
		The resistance of the braking resistor being used is too low.

Cause	Possible Solution
The proper braking resistor option has not been installed.	Select the braking resistor option so that fits to the drives braking transistor specification.
Regenerative converter, regenerative unit, or braking unit is being used.	Disable the braking transistor protection selection (set L8-55 to 1).

Digital Operator Display		Fault Name
rH	rH	Braking Resistor Overheat
		Braking resistor protection was triggered. Fault detection is enabled when L8-01 = 1 (disabled as a default).

Cause	Possible Solution
Deceleration time is too short and excessive regenerative energy is flowing back into the drive.	• Check the load, deceleration time, and speed. • Reduce the load inertia. • Increase the deceleration times (C1-02, C1-04, C1-06, C1-08, C1-09). • Replace the dynamic braking option with a larger device that can handle the power that is discharged.
Excessive braking inertia.	Recalculate braking load and braking power. Reduce the braking load by adjusting braking resistor settings.
The braking operation duty cycle is too high.	Check the braking operation duty cycle. Braking resistor protection for ERF-type braking resistors (L8-01 = 1) allows a braking duty cycle of maximum 3%.
The proper braking resistor has not been installed.	• Check the specifications and conditions for the braking resistor device. • Select the optimal braking resistor.

Note: The magnitude of the braking load trips the braking resistor overheat alarm, NOT the surface temperature. Using the braking resistor more frequently than it is rated for trips the alarm even when the braking resistor surface is not very hot.

Digital Operator Display		Fault Name
rr	rr	Dynamic Braking Transistor
		The built-in dynamic braking transistor failed.

Cause	Possible Solution
The braking transistor is damaged.	• Cycle power to the drive and check if the fault reoccurs. *Refer to Diagnosing and Resetting Faults on page 341*. • Replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.
The control circuit is damaged.	

Digital Operator Display		Fault Name
SC *<3> <4>*	SC	IGBT Short Circuit

Cause	Possible Solution
IGBT fault.	• Check the wiring to the motor. • Turn the power supply off and then on again to check operation.
IGBT short circuit detection circuit fault.	⇒ If the problem continues, contact your Yaskawa representative or nearest Yaskawa sales office.

Digital Operator Display		Fault Name
SEr	SEr	Too Many Speed Search Restarts
		The number of Speed Search restarts exceeded the number set to b3-19.
Cause		**Possible Solution**
Speed Search parameters are set to the wrong values.		• Reduce the detection compensation gain during Speed Search (b3-10). • Increase the current level when attempting Speed Search (b3-17). • Increase the detection time during Speed Search (b3-18). • Repeat Auto-Tuning.
The motor is coasting in the opposite direction of the Run command.		Enable Bi-Directional Speed Search (b3-14 = 1).

Digital Operator Display		Fault Name
STo	STo	Motor Pull Out or Step Out Detection
		Motor pull out or step out has occurred. Motor has exceeded its pull-out torque.
Cause		**Possible Solution**
The wrong motor code is set (Yaskawa motors only).		• Enter the correct motor code for the PM being used into E5-01. • For special-purpose motors, enter the correct data to all E5 parameters according to the test report provided for the motor.
Load is too heavy.		• Increase the load inertia for PM motor (n8-55). • Increase the pull-in current during accel/decel (n8-51). • Reduce the load. • Increase the motor or drive capacity.
Load inertia is too heavy.		Increase the load inertia for PM motor (n8-55).
Acceleration and deceleration times are too short.		• Increase the acceleration and deceleration times (C1-01 through C1-08). • Increase the S-curve acceleration and deceleration times (C2-01).
Speed response is too slow.		Increase the load inertia for PM motor (n8-55).

Digital Operator Display		Fault Name
SvE	SvE	Zero Servo Fault
		Position deviation during zero servo.
Cause		**Possible Solution**
Torque limit is set too low.		Set the torque limit to an appropriate value using parameters L7-01 to L7-04.
Excessive load torque.		Reduce the amount of load torque.
Noise interference along PG encoder wiring.		Check the PG signal for noise interference.

Digital Operator Display		Fault Name
THo [2]	THo	Thermistor Disconnect
		The thermistor used to detect motor temperature has become disconnected.
Cause		**Possible Solution**
The motor thermistor is not connected properly.		Check the wiring for the thermistor.

Digital Operator Display		Fault Name
UL3	UL3	Undertorque Detection 1
		The current has fallen below the minimum value set for torque detection (L6-02) for longer than the allowable time (L6-03).
Cause		**Possible Solution**
Parameter settings are not appropriate for the load.		Check the settings of parameters L6-02 and L6-03.
There is a fault on the machine side.		Check the load for any problems.

Digital Operator Display		Fault Name
UL4	UL4	Undertorque Detection 2
		The current has fallen below the minimum value set for torque detection (L6-05) for longer than the allowable time (L6-06).
Cause		**Possible Solution**
Parameter settings are not appropriate for the load.		Check the settings of parameters L6-05 and L6-06.
There is a fault on the machine side.		Check the load for any problems.

Digital Operator Display		Fault Name
UL5	UL5	Mechanical Weakening Detection 2
		The operation conditions matched the conditions set to L6-08.
Cause		**Possible Solution**
Undertorque was detected and matched the conditions for mechanical loss detection set to L6-08.		Check the load side for any problems.

Digital Operator Display		Fault Name
UnbC [2]	UnbC	Current Unbalance
		Current flow has become unbalanced.
Cause		**Possible Solution**
The internal current sensor has detected a current unbalance situation.		• Check wiring. • Check for damaged transistors. • Check for short circuits or grounding problems on the connected motor.

Digital Operator Display		Fault Name
Uv1	Uv1	DC Bus Undervoltage
		One of the following conditions occurred while the drive was stopped: • Voltage in the DC bus fell below the undervoltage detection level (L2-05) • For 200 V class: approximately 190 V • For 400 V class: approximately 380 V (350 V when E1-01 is less than 400) The fault is output only if L2-01 = 0 or L2-01 = 1 and the DC bus voltage has fallen below the level set to L2-05 for longer than the time set to L2-02.
Cause		**Possible Solution**
Input power phase loss.		• The main circuit drive input power is wired incorrectly. • Correct the wiring.

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One of the drive input power wiring terminals is loose.	• Ensure there are no loose terminals. • Apply the tightening torque specified in this manual to fasten the terminals. ***Refer to Wire Gauges and Tightening Torque on page 68***
There is a problem with the voltage from the drive input power.	• Check the voltage. • Correct the voltage to be within the range listed in drive input power specifications. • If there is no problem with the power supply to the main circuit, check for problems with the main circuit magnetic contactor.
The power has been interrupted.	Correct the drive input power.
The main circuit capacitors are worn.	• Check the maintenance time for the capacitors (U4-05). • Replace either the control board or the entire drive if U4-05 exceeds 90%. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.
The relay or contactor on the soft-charge bypass circuit is damaged.	• Cycle power to the drive and see if the fault reoccurs. • If the problem continues, replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative. • Check monitor U4-06 for the performance life of the soft-charge bypass. • Replace either the control board or the entire drive if U4-06 exceeds 90%. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.

Digital Operator Display		Fault Name
$Uu2$	Uv2	Control Power Supply Voltage Fault
		Voltage is too low for the control drive input power.

Cause	Possible Solution
For models CIMR-A☐2A0004 through 2A0056 and CIMR-A☐4A0002 through 4A0031: L2-02 was changed from its default value without installing a Momentary Power Loss Ride-Thru unit.	Correct the setting to L2-02 or install an optional Momentary Power Loss Ride-Thru unit.
Control power supply wiring is damaged.	• Cycle power to the drive. Check if the fault reoccurs. • If the problem continues, replace the control board, the entire drive, or the control power supply.
Internal circuitry is damaged.	• Cycle power to the drive. Check if the fault reoccurs. • If the problem continues, replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.

Digital Operator Display		Fault Name
$Uu3$	Uv3	Undervoltage 3 (Soft-Charge Bypass Circuit Fault)
		The soft-charge bypass circuit has failed.

Cause	Possible Solution
The relay or contactor on the soft-charge bypass circuit is damaged.	• Cycle power to the drive and see if the fault reoccurs. • If the problem continues, replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative. • Check monitor U4-06 for the performance life of the soft-charge bypass. • Replace either the control board or the entire drive if U4-06 exceeds 90%. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.

Digital Operator Display		Fault Name
$Uu4$ [2]	Uv4	Gate Drive Board Undervoltage
		Voltage drop in the gate drive board circuit.

Cause	Possible Solution
Not enough power is being supplied to the gate drive board.	• Cycle power to the drive and see if the fault reoccurs. ***Refer to Diagnosing and Resetting Faults on page 341***. • If the problem continues, replace either the gate drive board or the entire drive. For instructions on replacing the gate board, contact Yaskawa or a Yaskawa representative.

Digital Operator Display		Fault Name
uoF	voF	Output Voltage Detection Fault
		Problem detected with the voltage on the output side of the drive.

Cause	Possible Solution
Hardware is damaged.	Replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.

<1> Displayed as $CPF00$ or $CPF20$ when occurring at drive power up. When one of the faults occurs after successfully starting the drive, the display will show $CPF01$ or $CPF21$.
<2> Occurs in models CIMR-A☐4A0930 and 4A1200.
<3> Valid from the drive software version S1015 and later.
<4> Does not occur in models CIMR-A☐4A0930 and 4A1200.

6.5 Alarm Detection

◆ Alarm Codes, Causes, and Possible Solutions

Alarms are drive protection functions that do not necessarily cause the drive to stop. Once the cause of an alarm is removed, the drive will return to the same status is was before the alarm occurred.

When an alarm has been triggered, the ALM light on the digital operator display blinks and the alarm code display flashes. If a multi-function output is set for an alarm (H2-□□ = 10), that output terminal will be triggered.

Note: If a multi-function output is set to close when an alarm occurs (H2-□□ = 10), it will also close when maintenance periods are reached, triggering alarms LT-1 through LT-4 (triggered only if H2-□□ = 2F).

Table 6.16 Alarm Codes, Causes, and Possible Solutions

Digital Operator Display		Minor Fault Name
REr	AEr	Communication Option Station Number Setting Error (CC-Link, CANopen, MECHATROLINK-II)
		Option card node address is outside the acceptable setting range.
Cause		**Possible Solutions**
Station number is set outside the possible setting range.		• Set parameter F6-10 to the proper value if a CC-Link option card is used. • Set parameter F6-35 to the proper value if a CANopen option card is used.
Digital Operator Display		**Minor Fault Name**
bb	bb	Baseblock
		Drive output interrupted as indicated by an external baseblock signal.
Cause		**Possible Solutions**
External baseblock signal was entered via one of the multi-function input terminals (S1 to S8).		Check external sequence and baseblock signal input timing.
Digital Operator Display		**Minor Fault Name**
boL	boL	Braking Transistor Overload Fault
		The braking transistor in the drive has been overloaded.
Cause		**Possible Solutions**
The proper braking resistor has not been installed.		Select the optimal braking resistor.
Digital Operator Display		**Minor Fault Name**
bUS	bUS	Option Communication Error
		• After initial communication was established, the connection was lost. • Assign a Run command frequency reference to the option card.
Cause		**Possible Solutions**
Connection is broken or master controller stopped communicating.		• Check for faulty wiring. • Correct the wiring. • Check for disconnected cables and short circuits. Repair as needed.
Option card is damaged.		If there are no problems with the wiring and the fault continues to occur, replace the option card.
The option card is not properly connected to the drive.		• The connector pins on the option card are not properly lined up with the connector pins on the drive. • Reinstall the option card.
A data error occurred due to noise.		• Check options available to minimize the effects of noise. • Take steps to counteract noise in the control circuit wiring, main circuit lines and ground wiring. • Try to reduce noise on the controller side. • Use surge absorbers on magnetic contactors or other equipment causing the disturbance. • Use recommended cables or some other type of shielded line. Ground the shield to the controller side or on the input power side. • All wiring for comm. devices should be separated from drive input power lines. Install an EMC noise filter to the drive input power.
Digital Operator Display		**Minor Fault Name**
CALL	CALL	Serial Communication Transmission Error
		Communication has not yet been established.
Cause		**Possible Solutions**
Communications wiring is faulty, there is a short circuit, or something is not connected properly.		• Check for wiring errors. • Correct the wiring. • Check for disconnected cables and short circuits. Repair as needed.
Programming error on the master side.		Check communications at start-up and correct programming errors.
Communications circuitry is damaged.		• Perform a self-diagnostics check. • If the problem continues, replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.
Termination resistor setting is incorrect.		A termination resistor must be installed at both ends of a communication line. Slave drives must have the internal termination resistor switch set correctly. Place DIP switch S2 to the ON position.

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Digital Operator Display		Minor Fault Name	
CE	CE	MEMOBUS/Modbus Communication Error	
		Control data was not received correctly for two seconds.	
Cause		**Possible Solutions**	
A data error occurred due to noise.		• Check options available to minimize the effects of noise. • Take steps to counteract noise in the control circuit wiring, main circuit lines, and ground wiring. • Reduce noise on the controller side. • Use surge absorbers for the magnetic contactors or other components that may be causing the disturbance. • Use only recommended shielded line. Ground the shield on the controller side or on the drive input power side. • Separate all wiring for comm. devices from drive input power lines. Install an EMC noise filter to the drive input power supply.	
Communication protocol is incompatible.		• Check the H5 parameter settings as well as the protocol setting in the controller. • Ensure settings are compatible.	
The CE detection time (H5-09) is set shorter than the time required for a communication cycle to take place.		• Check the PLC. • Change the software settings in the PLC. • Set a longer CE detection time (H5-09).	
Incompatible PLC software settings or there is a hardware problem.		• Check the PLC. • Remove the cause of the error on the controller side.	
Communications cable is disconnected or damaged.		• Check the connector to make sure the cable has a signal. • Replace the communications cable.	

Digital Operator Display		Minor Fault Name	
CrST	CrST	Cannot Reset	
Cause		**Possible Solutions**	
A fault reset command was entered while the Run command was still present.		• Ensure that a Run command cannot be entered from the external terminals or option card during fault reset. • Turn off the Run command.	

Digital Operator Display		Minor Fault Name	
dEv	dEv	Speed Deviation (when using a PG option card)	
		The deviation between the speed reference and speed feedback is greater than the setting in F1-10 for longer than the time in F1-11.	
Cause		**Possible Solutions**	
Load is too heavy		Reduce the load.	
Acceleration and deceleration times are set too short.		Increase the acceleration and deceleration times (C1-01 through C1-08).	
The load is locked up.		Check the machine.	
Parameter settings are inappropriate.		Check the settings of parameters F1-10 and F1-11.	
Incorrect speed feedback scaling if terminal RP is used as speed feedback input in V/f Control.		• Set H6-02 to value of the speed feedback signal frequency when the motor runs at the maximum speed. • Adjust the speed feedback signal using parameters H6-03 through H6-05. • Make sure the speed feedback signal frequency does not exceed he maximum input frequency of terminal RP.	
The motor brake engaged.		Ensure the brake releases properly.	

Digital Operator Display		Minor Fault Name	
dnE	dnE	Drive Disabled	
Cause		**Possible Solutions**	
"Drive Enable" is set to a multi-function contact input (H1-□□ = 6A) and that signal was switched off.		Check the operation sequence.	

Digital Operator Display		Minor Fault Name	
EF	EF	Forward/Reverse Run Command Input Error	
		Both forward run and reverse run closed simultaneously for over 0.5 s.	
Cause		**Possible Solutions**	
Sequence error		Check the forward and reverse command sequence and correct the problem. **Note:** When minor fault EF detected, motor ramps to stop.	

Digital Operator Display		Minor Fault Name	
EF0	EF0	Option Card External Fault	
		An external fault condition is present.	
Cause		**Possible Solutions**	
An external fault was received from the PLC with F6-03 = 3 (causing the drive to continue running when an external fault occurs).		• Remove the cause of the external fault. • Remove the external fault input from the PLC.	
There is a problem with the PLC program.		Check the PLC program and correct problems.	

Digital Operator Display		Minor Fault Name	
EF1	EF1	External fault (input terminal S1)	
		External fault at multi-function input terminal S1.	
EF2	EF2	External fault (input terminal S2)	
		External fault at multi-function input terminal S2.	
EF3	EF3	External fault (input terminal S3)	
		External fault at multi-function input terminal S3.	
EF4	EF4	External fault (input terminal S4)	
		External fault at multi-function input terminal S4.	
EF5	EF5	External fault (input terminal S5)	
		External fault at multi-function input terminal S5.	
EF6	EF6	External fault (input terminal S6)	
		External fault at multi-function input terminal S6.	

EF7	EF7	External fault (input terminal S7)
		External fault at multi-function input terminal S7.
EF8	EF8	External fault (input terminal S8)
		External fault at multi-function input terminal S8.

Cause	Possible Solutions
An external device has tripped an alarm function.	Remove the cause of the external fault and reset the multi-function input value.
Wiring is incorrect.	• Ensure the signal lines have been connected properly to the terminals assigned for external fault detection (H1-□□ = 20 to 2F). • Reconnect the signal line.
Multi-function contact inputs are set incorrectly.	• Check if the unused terminals have been set for H1-□□ = 20 to 2F (External Fault). • Change the terminal settings.

Digital Operator Display		Minor Fault Name
FbH	FbH	Excessive PID Feedback
		The PID feedback input is higher than the level set in b5-36 for longer than the time set in b5-37, and b5-12 is set to 1 or 4.

Cause	Possible Solutions
Parameters settings for b5-36 and b5-37 are incorrect.	Check parameters b5-36 and b5-37.
PID feedback wiring is faulty.	Correct the wiring.
Feedback sensor has malfunctioned.	Check the sensor and replace it if damaged.
Feedback input circuit is damaged.	Replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.

Digital Operator Display		Minor Fault Name
FbL	FbL	PID Feedback Loss
		The PID feedback input is lower than the level set in b5-13 for longer than the time set in b5-14, and b5-12 is set to 1 or 4.

Cause	Possible Solutions
Parameters settings for b5-13 and b5-14 are incorrect.	Check parameters b5-13 and b5-14.
PID feedback wiring is faulty.	Correct the wiring.
Feedback sensor has malfunctioned.	Check the sensor and replace it if damaged.
Feedback input circuit is damaged.	Replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.

Digital Operator Display		Minor Fault Name
Hbb	Hbb	Safe Disable Signal Input
		Both Safe Disable Input channels are open.

Cause	Possible Solutions
Both Safe Disable Inputs H1 and H2 are open.	• Check signal status at the input terminals H1 and H2. • Check the Sink/Source Selection for the digital inputs. • If the Safe Disable function is not utilized, check if the terminals H1-HC, and H2-HC are linked.
Internally, both Safe Disable channels are broken.	Replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.

Digital Operator Display		Minor Fault Name
HbbF	HbbF	Safe Disable Signal Input
		One Safe Disable channel is open while the other one is closed.

Cause	Possible Solutions
The signals to the Safe Disable inputs are wrong or the wiring is incorrect.	Check signal status at the input terminals H1 and H2. If the Safe Disable function is not utilized, the terminals H1-HC, and H2-HC must be linked.
One of the Safe Disable channels is faulty.	Replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.

Digital Operator Display		Minor Fault Name
HCA	HCA	Current Alarm
		Drive current exceeded overcurrent warning level (150% of the rated current).

Cause	Possible Solutions
Load is too heavy.	Either reduce the load for applications with repetitive operation (repetitive stops and starts, etc.), or replace the drive.
Acceleration and deceleration times are too short.	• Calculate the torque required during acceleration and for the inertia moment. • If the torque level is not right for the load, take the following steps: • Increase the acceleration and deceleration times (C1-01 through C1-08). • Increase the capacity of the drive.
A special-purpose motor is being used, or the drive is attempting to run a motor greater than the maximum allowable capacity.	• Check the motor capacity. • Use a motor appropriate for the drive. Ensure the motor is within the allowable capacity range.
The current level increased due to Speed Search after a momentary power loss or while attempting to perform a fault restart.	The alarm will appear only briefly. There is no need to take action to prevent the alarm from occurring in such instances.

Digital Operator Display		Minor Fault Name
LT-1	LT-1	Cooling Fan Maintenance Time
		The cooling fan has reached its expected maintenance period and may need to be replaced. **Note:** An alarm output (H2-□□ = 10) will only be triggered if both (H2-□□ = 2F and H2-□□ = 10) are set.

Cause	Possible Solutions
The cooling fan has reached 90% of its expected performance life.	Replace the cooling fan and reset the Maintenance Monitor by setting o4-03 to 0.

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Digital Operator Display		Minor Fault Name
$LT-2$	LT-2	Capacitor Maintenance Time
		The main circuit and control circuit capacitors are nearing the end of their expected performance life. **Note:** An alarm output (H2-□□ = 10) will only be triggered if H2-□□ = 2F.
Cause		**Possible Solutions**
The main circuit and control circuit capacitors have reached 90% of their expected performance life.		Replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.

Digital Operator Display		Minor Fault Name
$LT-3$	LT-3	Soft Charge Bypass Relay Maintenance Time
		The DC bus soft charge relay is nearing the end of its expected performance life. **Note:** An alarm output (H2-□□ = 10) will only be triggered if H2-□□ = 2F.
Cause		**Possible Solutions**
The DC bus soft charge relay has reached 90% of their expected performance life.		Replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.

Digital Operator Display		Minor Fault Name
$LT-4$	LT-4	IGBT Maintenance Time (50%)
		IGBTs have reached 50% of their expected performance life. **Note:** An alarm output (H2-□□ = 10) will only be triggered if H2-□□ = 2F.
Cause		**Possible Solutions**
IGBTs have reached 50% of their expected performance life.		Check the load, carrier frequency, and output frequency.

Digital Operator Display		Minor Fault Name
oH	oH	Heatsink Overheat
		The temperature of the heatsink exceeded the overheat pre-alarm level set to L8-02 (90-100°C). Default value for L8-02 is determined by drive capacity (o2-04).
Cause		**Possible Solutions**
Surrounding temperature is too high		• Check the surrounding temperature. • Improve the air circulation within the enclosure panel. • Install a fan or air conditioner to cool surrounding area. • Remove anything near drive that may cause extra heat.
Internal cooling fan has stopped.		• Replace the cooling fan. *Refer to Cooling Fan Component Names on page 360*. • After replacing the drive, reset the cooling fan maintenance parameter to (o4-03 = "0").
Airflow around the drive is restricted.		• Provide proper installation space around the drive as indicated in the manual. *Refer to Installation Orientation and Spacing on page 40*. • Allow for the specified space and ensure that there is sufficient circulation around the control panel.
		• Check for dust or foreign materials clogging cooling fan. • Clear debris caught in the fan that restricts air circulation.

Digital Operator Display		Minor Fault Name
$oH2$	oH2	Drive Overheat Warning
		"Drive Overheat Warning" was input to a multi-function input terminal, S1 through S8 (H1-□□= B)
Cause		**Possible Solutions**
An external device triggered an overheat warning in the drive.		• Search for the device that tripped the overheat warning. • Solving the problem will clear the warning.

Digital Operator Display		Minor Fault Name
$oH3$	oH3	Motor Overheat
		The motor overheat signal entered to a multi-function analog input terminal exceeded the alarm level (H3-02, H3-06 or H3-10 = E).
Cause		**Possible Solutions**
Motor thermostat wiring is fault (PTC input).		Repair the PTC input wiring.
There is a fault on the machine side (e.g., the machine is locked up).		• Check the status of the machine. • Remove the cause of the fault.
Motor has overheated.		• Check the load size, accel/decel times, and cycle times. • Decrease the load. • Increase accel and decel times (C1-01 to C1-08). • Adjust the preset V/f pattern (E1-04 through E1-10). This will mainly involve reducing E1-08 and E1-10. **Note:** Do not lower E1-08 and E1-10 excessively, because this reduces load tolerance at low speeds. • Check the motor-rated current. • Enter motor-rated current on motor nameplate (E2-01). • Ensure the motor cooling system is operating normally. • Repair or replace the motor cooling system.

Digital Operator Display		Minor Fault Name
$oH5$ *<1>*	oH5	Motor Overheat (NTC Input)
		The motor temperature exceeded the level set in L1-16 (or L1-18 for motor 2).
Cause		**Possible Solution**
Motor has overheated.		• Reduce the load. • Check the ambient temperature.

Digital Operator Display		Minor Fault Name
$oL3$	oL3	Overtorque 1
		Drive output current (or torque in OLV, CLV, AOLV/PM, CLV/PM) was greater than L6-02 for longer than the time set in L6-03.
Cause		**Possible Solutions**
Inappropriate parameter settings.		Check parameters L6-02 and L6-03.
There is a fault on the machine side (e.g., the machine is locked up).		• Check the status of the machine. • Remove the cause of the fault.

Digital Operator Display		Minor Fault Name
$oL4$	oL4	Overtorque 2
		Drive output current (or torque in OLV, CLV, AOLV/PM, CLV/PM) was greater than L6-05 for longer than the time set in L6-06.
Cause		**Possible Solutions**
Parameter settings are not appropriate.		Check parameters L6-05 and L6-06.
There is a fault on the machine side (e.g., the machine is locked up).		• Check the status of the machine being used. • Remove the cause of the fault.
Digital Operator Display		**Minor Fault Name**
$oL5$	oL5	Mechanical Weakening Detection 1
		Overtorque occurred, matching the conditions specified in L6-08.
Cause		**Possible Solutions**
Overtorque occurred, triggering the mechanical weakening level set to L6-08.		• Check for the cause of mechanical weakening.
Digital Operator Display		**Minor Fault Name**
oS	oS	Overspeed (for Control Mode with PG)
		The motor speed feedback exceeded the F1-08 setting.
Cause		**Possible Solutions**
Overshoot is occurring.		• Increase the settings for C5-01 (Speed Control Proportional Gain 1) and reduce C5-02 (Speed Control Integral Time 1). • If using a Closed Loop Vector mode enable Feed Forward Control and perform Inertia Auto-Tuning.
Incorrect speed feedback scaling if terminal RP is used as speed feedback input in V/f control		• Set H6-02 to value of the speed feedback signal frequency when the motor runs at the maximum speed. • Adjust the input signal using parameters H6-03 through H6-05.
Incorrect PG pulse number has been set		• Check and correct parameter F1-01.
Inappropriate parameter settings.		Check the setting for the overspeed detection level and the overspeed detection time (F1-08 and F1-09).
Digital Operator Display		**Minor Fault Name**
ou	ov	DC Bus Overvoltage
		The DC bus voltage exceeded the trip point. For 200 V class: approximately 410 V For 400 V class: approximately 820 V
Cause		**Possible Solutions**
Surge voltage present in the drive input power.		• Install a DC reactor or an AC reactor. • Voltage surge can result from a thyristor convertor and a phase advancing capacitor operating on the same drive input power system.
The motor is short-circuited.		• Check the motor power cable, relay terminals and motor terminal box for short circuits. • Correct grounding shorts and turn the power back on.
Ground current has over-charged the main circuit capacitors via the drive input power.		
Noise interference causes the drive to operate incorrectly.		• Review possible solutions for handling noise interference. • Review section on handling noise interference and check control circuit lines, main circuit lines and ground wiring. • If the magnetic contactor is identified as a source of noise, install a surge protector to the MC coil.
		Set number of fault restarts (L5-01) to a value other than 0.
PG cable is disconnected.		Reconnect the cable.
PG cable wiring is wrong.		Correct the wiring.
Noise interference along PG encoder wiring.		Separate PG wiring from the source of the noise (often output wiring from the drive).
Digital Operator Display		**Minor Fault Name**
$PASS$	PASS	MEMOBUS/Modbus Comm. Test Mode Complete
Cause		**Possible Solutions**
MEMOBUS/Modbus test has finished normally.		This verifies that the test was successful.
Digital Operator Display		**Minor Fault Name**
PGo	PGo	PG Disconnect (for Control Mode with PG)
		Detected when no PG pulses are received for a time longer than setting in F1-14.
Cause		**Possible Solutions**
PG cable is disconnected.		Reconnect the cable.
PG cable wiring is wrong.		Correct the wiring.
PG encoder does not have enough power.		Make sure the correct power supply is properly connected to the PG encoder.
Brake is holding the PG.		Ensure the brake releases properly
Digital Operator Display		**Minor Fault Name**
$PGoH$	PGoH	PG Hardware Fault (detected when using a PG-X3 option card)
		PG cable has become disconnected.
Cause		**Possible Solutions**
PG cable is disconnected.		Reconnect the cable. Check the setting of F1-20.
Digital Operator Display		**Minor Fault Name**
rUn	rUn	Motor Switch during Run
		A command to switch motors was entered during run.
Cause		**Possible Solutions**
A motor switch command was entered during run.		Change the operation pattern so that the motor switch command is entered while the drive is stopped.

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Digital Operator Display		Minor Fault Name
$5E$	SE	MEMOBUS/Modbus Communication Test Mode Error **Note:** This alarm will not trigger a multi-function output terminal that is set for alarm output (H2-□□ = 10).
Cause		**Possible Solutions**
A digital input set to 67H (MEMOBUS/Modbus test) was closed while the drive was running.		Stop the drive and run the test again.

Digital Operator Display		Minor Fault Name
ΓHo *‹1›*	THo	Thermistor Disconnect
		The thermistor that detects motor temperature has become disconnected.
Cause		**Possible Solutions**
The motor thermistor is not connected properly.		Check the thermistor wiring.

Digital Operator Display		Minor Fault Name
ΓrPC	TrPC	IGBT Maintenance Time (90%)
		IGBTs have reached 90% of their expected performance life.
Cause		**Possible Solutions**
IGBTs have reached 90% of their expected performance life.		Replace the drive.

Digital Operator Display		Minor Fault Name
$UL3$	UL3	Undertorque Detection 1
		Drive output current (or torque in OLV, CLV, AOLV/PM, CLV/PM) less than L6-02 for longer than L6-03 time.
Cause		**Possible Solutions**
Inappropriate parameter settings.		Check parameters L6-02 and L6-03.
Load has dropped or decreased significantly.		Check for broken parts in the transmission system.

Digital Operator Display		Minor Fault Name
$UL4$	UL4	Undertorque Detection 2
		Drive output current (or torque in OLV, CLV, AOLV/PM, CLV/PM) less than L6-05 for longer than L6-06 time.
Cause		**Possible Solutions**
Inappropriate parameter settings.		Check parameters L6-05 and L6-06.
The load has dropped or decreased significantly.		Check for broken parts in the transmission system.

Digital Operator Display		Minor Fault Name
Uu	Uv	Undervoltage
		One of the following conditions was true when the drive was stopped and a Run command was entered: • DC bus voltage dropped below the level specified in L2-05. • Contactor to suppress inrush current in the drive was opened. • Low voltage in the control drive input power. This alarm outputs only if L2-01 is not 0 and DC bus voltage is under L2-05.
Cause		**Possible Solutions**
Phase loss in the drive input power.		Check for wiring errors in the main circuit drive input power. Correct the wiring.
Loose wiring in the drive input power terminals.		• Ensure the terminals have been properly tightened. • Apply the tightening torque to the terminals as specified. ***Refer to Wire Gauges and Tightening Torque on page 68***
There is a problem with the drive input power voltage.		• Check the voltage. • Lower the voltage of the drive input power so that it is within the limits listed in the specifications.
Drive internal circuitry is worn.		• Check the maintenance time for the capacitors (U4-05). • Replace either the control board or the entire drive if U4-05 exceeds 90%. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.
The drive input power transformer is too small and voltage drops when the power is switched on.		• Check for an alarm when the magnetic contactor, line breaker, and leakage breaker are closed. • Check the capacity of the drive input power transformer.
Air inside the drive is too hot.		• Check the temperature inside the drive.
The CHARGE light is broken or disconnected.		Replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.

Digital Operator Display		Minor Fault Name
uoF	voF	Output Voltage Detection Fault
		There is a problem with the output voltage.
Cause		**Possible Solutions**
Hardware is damaged.		Replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.

‹1› Occurs in models CIMR-A□4A0930 and 4A1200.

6.6 Operator Programming Errors

◆ oPE Codes, Causes, and Possible Solutions

An Operator Programming Error (oPE) occurs when a contradictory parameter is set or an individual parameter is set to an inappropriate value.

The drive will not operate until the parameter or parameters causing the problem are set correctly. An oPE, however, does not trigger an alarm or fault output. If an oPE occurs, investigate the cause and *Refer to oPE Codes, Causes, and Possible Solutions on page 333* for the appropriate action. When an oPE appears on the operator display, press the ENTER button to view U1-18 and see the parameter that is causing the oPE error (U1-18).

Table 6.17 oPE Codes, Causes, and Possible Solutions

Digital Operator Display		Error Name
$oPE01$	oPE01	Drive Capacity Setting Fault
		Drive capacity and the value set to o2-04 do not match.
Cause		**Possible Solutions**
The drive model selection (o2-04) and the actual capacity of the drive are not the same.		Correct the value set to o2-04.

Digital Operator Display		Error Name
$oPE02$	oPE02	Parameter Range Setting Error
		Use U1-18 to find parameters set outside the range.
Cause		**Possible Solutions**
Parameters were set outside the possible setting range.		Set parameters to the proper values.

Note: When multiple errors occur at the same time, other errors are given precedence over oPE02.

Digital Operator Display		Error Name
$oPE03$	oPE03	Multi-Function Input Selection Error
		A contradictory setting is assigned to multi-function contact inputs H1-01 to H1-08.

Cause	**Possible Solutions**
• The same function is assigned to two multi-function inputs. • Excludes "Not used" and "External Fault."	• Ensure all multi-function inputs are assigned to different functions. • Re-enter the multi-function settings to ensure this does not occur.
The Up command was set but the Down command was not, or vice versa (settings 10 vs. 11).	Correctly set functions that need to be enabled in combination with other functions.
The Up 2 command was set but the Down 2 command was not, or vice versa (settings 75 vs. 76).	
• Run/Stop command for a 2-wire sequence was set (H1-□□ = 42), but Forward/Reverse command (H1-□□ = 43) was not. • "Drive Enable" is set to multi-function input S1 or S2 (H1-01 = 6A or H1-02 = 6A).	Correctly set functions that need to be enabled in combination with other functions.
• Two of the following functions are set at the same time: • Up/Down Command (10 vs. 11) • Up 2/Down 2 Command (75 vs. 76) • Hold Accel/Decel Stop (A) • Analog Frequency Reference Sample/Hold (1E) • Offset Frequency 1, 2, 3 Calculations (44, 45, 46)	• Check if contradictory settings have been assigned to the multi-function input terminals at the same time. • Correct setting errors.
The Up/Down command (10, 11) is enabled at the same time as PID control (b5-01).	Disable control PID (b5-01 = 0) or disable the Up/Down command.
Settings for N.C. and N.O. input for the following functions were selected at the same time: • External Search Command 1 and External Search Command 2 (61 vs. 62) • Fast Stop N.O. and Fast Stop N.C. (15 vs. 17) • KEB for Momentary Power Loss and High Slip Braking (65, 66, 7A, 7B vs. 68) • Motor Switch Command and Accel/Decel Time 2 (16 vs. 1A) • KEB Command 1 and KEB Command 2 (65, 66 vs. 7A, 7B) • FWD Run Command (or REV) and FWD/REV Run Command (2-wire) (40, 41 vs. 42, 43) • External DB Command and Drive Enable (60 vs. 6A) • Motor Switch Command and Up 2/Down 2 Command (16 vs. 75, 76)	Check for contradictory settings assigned to the multi-function input terminals at the same time. Correct setting errors.
One of the following settings was entered while H1-□□ = 2 (External Reference 1/2): • b1-15 = 4 (Pulse Train Input) but the pulse train input selection is not set for the frequency reference (H6-01 > 0) • b1-15 or b1-16 set to 3 but no option card is connected • Although b1-15 = 1 (Analog Input) and H3-02 or H3-10 are set to 0 (Frequency Bias)	Correct the settings for the multi-function input terminal parameters.
H2-□□ = 38 (Drive Enabled) but H1-□□ is not set to 6A (Drive Enable).	
H1-□□ = 7E (Direction Detection) although H6-01 is not set to 3 (for V/f Control with PG using terminal RP as speed feedback input).	

Digital Operator Display		Error Name
$oPE04$	oPE04	Initialization required.
Cause		**Possible Solutions**
The drive, control board, or terminal board has been replaced and the parameter settings between the control board and the terminal board no longer match.		To load the parameter settings to the drive that are stored in the terminal board, set A1-03 to 5550. Initialize parameters after drive replacement by setting A1-03 to 1110 or 2220.

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Digital Operator Display		Error Name
oPE05	oPE05	Run Command/Frequency Reference Source Selection Error

Cause	Possible Solutions
Frequency reference is assigned to an option card (b1-01 = 3) but an input option card is not connected to the drive.	Reconnect the input option card to the drive.
The Run command is assigned to an option card (b1-02 = 3) but an input option card is not connected to the drive.	
Frequency reference is assigned to the pulse train input (b1-01 = 4), but terminal RP is not set for frequency reference input (H6-01 > 0)	Set H6-01 to "0".
Although the digital card input is set for BCD special for a 5 digit input (F3-01 = 6), the data length is set for 8 bit or 12 bit (F3-03 = 0, 1).	Set the input data for 16 bit (F3-03 = 2).
The following values have been set while an AI-A3 option card is installed: • The source of frequency reference setting is assigned to an option card (b1-01 = 3). • The action for the analog card is set for separate terminal input (F2-01 = 0).	Make sure parameters are set properly.

Digital Operator Display		Error Name
oPE06	oPE06	Control Method Selection Error
		Correct the setting for the control method.

Cause	Possible Solutions
A control mode has been selected that requires a PG option card to be installed, but no PG encoder is installed (A1-02 = 1, 3, or 7).	• Connect a PG option card. • Correct the value set to A1-02.

Digital Operator Display		Error Name
oPE07	oPE07	Multi-Function Analog Input Selection Error
		A contradictory setting is assigned to multi-function analog inputs H3-02, H3-06, or H3-10 and PID functions conflict.

Cause	Possible Solutions
At least two analog input terminals are set to the same function (i.e., at least two of these parameters has the same setting: H3-02, H3-06, or H3-10).	Change the settings to H3-02, H3-06, and H3-10 so that functions no longer conflict. **Note:** Both 0 (frequency reference bias) and F (not used) can be set to H3-02, H3-06, and H3-10 at the same time.
The following simultaneous contradictory settings: • H3-02, H3-06, or H3-10 = B (PID Feedback) while H6-01 (Pulse Train Input) = 1 (PID Feedback) • H3-02, H3-06, or H3-10 = C (PID Target Value) while H6-01 = 2 (pulse train input sets the PID target value) • H3-02, H3-06, or H3-10 = C (PID Target Value) while b5-18 = 1 (enables b5-19 as the target PID value) • H6-01 = 2 (PID target) while b5-18 = 1 (enables b5-19 as the target PID value)	Disable one of the PID selections.

Digital Operator Display		Error Name
oPE08	oPE08	Parameter Selection Error
		A function has been set that cannot be used in the motor control method selected.

Cause	Possible Solutions
Attempted to use a function that is not valid for the selected control mode.	Check the motor control method and the functions available.
In Open Loop Vector Control, n2-02 is greater than n2-03	Correct parameter settings so that n2-02 is less than n2-03.
In Open Loop Vector Control, C4-02 is greater than C4-06	Correct parameter settings so that C4-02 is less than C4-06.
In OLV/PM, parameters E5-02 to E5-07 are set to 0.	• Set the correct motor code in accordance with the motor being used (E5-01). • When using a special-purpose motor, set E5-□□ in accordance with the test report provided.
The following settings have occurred in OLV/PM: • E5-03 does not equal 0 • E5-09 and E5-24 are both equal to 0, or neither equals 0	• Set E5-09 or E5-24 to the correct value, and set the other to "0". • Set the motor rated current for PM to "0" (E5-03).
b1-14 (Phase Order Selection) is set to 1 (Switch phase order) when in using a PG option card.	Correct the parameter settings.
In AOLV/PM High Frequency Injection is disabled (n8-57 = 0) and the minimum frequency (E1-09) is set lower than 1/20 of the base frequency setting.	Correct the parameter settings.
Note: Use U1-18 to find which parameters are set outside the specified setting range. Other errors are given precedence over oPE08 when multiple errors occur at the same time.	

Digital Operator Display		Error Name
oPE09	oPE09	PID Control Selection Fault
		PID control function selection is incorrect. Requires that PID control is enabled (b5-01 = 1 to 4).

Cause	Possible Solutions
The following simultaneous contradictory settings have occurred: • b5-15 not 0.0 (PID Sleep Function Operation Level) • The stopping method is set to either DC Injection Braking or coast to stop with a timer (b1-03 = 2 or 3).	• Set b5-15 to another value besides 0. • Set the stopping method to coast to stop or ramp to stop (b1-03 = 0 or 1).
PID control is set to b5-01 = 1 or 2, but the lower limit for the frequency reference (d2-02) is not set to 0 while reverse output is enabled (b5-11 = 1).	Correct the parameter settings.
PID control is set to b5-01 = 3 or 4, but the lower limit for the frequency reference (d2-01) is not 0.	Correct the parameter settings.

Digital Operator Display		Error Name
oPE 10	oPE10	V/f Data Setting Error
		The following setting errors have occurred where: • E1-04 is greater than or equal to E1-06, E1-06 is greater than or equal to E1-07, E1-07 is greater than or equal to E1-09, or E1-09 is greater than or equal to E1-11. • E3-04 is greater than or equal to E3-06, E3-06 is greater than or equal to E3-07, E3-07 is greater than or equal to E3-09, or E3-09 is greater than or equal to E3-11.
Cause		**Possible Solutions**
V/f Pattern Setting Error		Correct the settings for E1-04, E1-06, E1-07, E1-09, and E1-11 (for motor 2, correct E3-04, E3-06, E3-07, E3-09, and E3-11).

Digital Operator Display		Error Name
oPE 11	oPE11	Carrier Frequency Setting Error
		Correct the setting for the carrier frequency.
Cause		**Possible Solutions**
The following simultaneous contradictory settings: C6-05 is greater than 6 and C6-04 is greater than C6-03 (carrier frequency lower limit is greater than the upper limit). If C6-05 is less than or equal to 6, the drive operates at C6-03.		Correct the parameter settings.
Upper and lower limits between C6-02 and C6-05 contradict each other.		

Digital Operator Display		Error Name
oPE 13	oPE13	Pulse Monitor Selection Error
		Incorrect setting of monitor selection for pulse train (H6-06).
Cause		**Possible Solutions**
Scaling for the pulse train monitor is set to 0 (H6-07 = 0) while H6-06 is not set to 101, 102, 105, or 116.		Change scaling for the pulse train monitor or set H6-06 to 101, 102, 105, or 116.

Digital Operator Display		Error Name
oPE 15	oPE15	Torque Control Setting Error
		Parameters settings that are not allowed in combination with Torque Control have been set.
Cause		**Possible Solutions**
Torque Control in enabled (d5-01 = 1) while the Speed/Torque Control switch function is assigned to a digital input (H1-□□ = 71).		Correct the parameter settings.
Either Torque Control is enabled by d5-01 = 1, the or Speed/Torque Control switch is assigned to a digital input H1-□□ = 71, while at the same time: • Feed Forward is enabled (n5-01 = 1), or • Droop Control is enabled (b7-01 ≠ 0), or • Intelligent Stall Prevention or Intelligent Stall Prevention 2 is enabled (L3-04 = 2 or 5), or • A digital input is set for the power KEB 1 or KEB 2 (H1-□□ = 7A or 7B)		

Digital Operator Display		Error Name
oPE 16	oPE16	Energy Savings Constants Error
Cause		**Possible Solutions**
In AOLV/PM the automatically calculated energy saving coefficients are out of the allowable range.		Check and correct the motor data in E5 parameters.

Digital Operator Display		Error Name
oPE 18	oPE18	Online Tuning Parameter Setting Error
		Parameters that control Online Tuning are not set correctly.
Cause		**Possible Solutions**
One of the following setting errors has occurred while Online Tuning is enabled in OLV (A1-02 = 2): • E2-02 has been set below 30% of the original default value • E2-06 has been set below 50% of the original default value • E2-03 = 0		Make sure E2-02, E2-03, and E2-06 are set the correct values.

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6.7 Auto-Tuning Fault Detection

Auto-Tuning faults are shown below. When the following faults are detected, the fault is displayed on the digital operator and the motor coasts to a stop. Auto-Tuning faults do not trigger an multi-function terminal set for fault or alarm output.

An End□ error indicates that although Auto-Tuning has completely successful, there is some discrepancy in the calculations the drive made. If an End□ error occurs, check for what might be causing the error using the table below, and perform Auto-Tuning again once the problem has been taken care of. If there appears to be no problem despite the End□ error being displayed, go ahead and start the application.

◆ Auto-Tuning Codes, Causes, and Possible Solutions

Table 6.18 Auto-Tuning Codes, Causes, and Possible Solutions

Digital Operator Display		Error Name
End1	End1	Excessive V/f Setting (detected only during Rotational Auto-Tuning, and displayed after Auto-Tuning is complete)
Cause		**Possible Solutions**
The torque reference exceeded 20% during Auto-Tuning.		• Before Auto-Tuning the drive, verify the information written on the motor nameplate and enter that data to T1-03 through T1-05. • Enter proper information to parameters T1-03 to T1-05 and repeat Auto-Tuning. • If possible, disconnect the motor from the load and perform Auto-Tuning. If the load cannot be uncoupled, simply use the Auto-Tuning results as they are.
The results from Auto-Tuning the no-load current exceeded 80%.		
Digital Operator Display		**Error Name**
End2	End2	Motor Iron-Core Saturation Coefficient (detected only during Rotational Auto-Tuning and displayed after Auto-Tuning is complete)
Cause		**Possible Solutions**
Motor data entered during Auto-Tuning was incorrect.		• Make sure the data entered to the T1 parameters match the information written on the motor nameplate. • Restart Auto-Tuning and enter the correct information.
Results from Auto-Tuning are outside the parameter setting range, assigning the iron-core saturation coefficient (E2-07, E2-08) a temporary value.		• Check and correct faulty motor wiring. • Disconnect the motor from machine and perform Rotational Auto-Tuning.
Digital Operator Display		**Error Name**
End3	End3	Rated Current Setting Alarm (displayed after Auto-Tuning is complete)
Cause		**Possible Solutions**
The correct current rating printed on the nameplate was not entered into T1-04.		• Check the setting of parameter T1-04. • Check the motor data and repeat Auto-Tuning.
Digital Operator Display		**Error Name**
End4	End4	Adjusted Slip Calculation Error
Cause		**Possible Solutions**
The slip that was calculated is outside the allowable range.		• Make sure the data entered for Auto-Tuning is correct. • Execute Rotational Auto-Tuning instead. If not possible, try Stationary Auto-Tuning 2.
Digital Operator Display		**Error Name**
End5	End5	Resistance Tuning Error
Cause		**Possible Solutions**
The resistance value that was calculated is outside the allowable range.		• Double check the data that was entered for the Auto-Tuning process. • Check the motor and motor cable connection for faults.
Digital Operator Display		**Error Name**
End6	End6	Leakage Inductance Alarm
Cause		**Possible Solutions**
The leakage inductance value that was calculated is outside the allowable range.		Double check the data that was entered for the Auto-Tuning process.
Digital Operator Display		**Error Name**
End7	End7	No-Load Current Alarm
Cause		**Possible Solutions**
The entered no-load current value was outside the allowable range.		Check and correct faulty motor wiring.
Auto-Tuning results were less than 5% of the motor rated current.		Double check the data that was entered for the Auto-Tuning process.
Digital Operator Display		**Error Name**
Er-01	Er-01	Motor Data Error
Cause		**Possible Solutions**
Motor data or data entered during Auto-Tuning was incorrect.		• Check that the motor data entered to T1 parameters matches motor nameplate input before Auto-Tuning. • Start Auto-Tuning over again and enter the correct information.
Motor output power and motor-rated current settings (T1-02 and T1-04) do not match.		• Check the drive and motor capacities. • Correct the settings of parameters T1-02 and T1-04.
Motor rated current and detected no-load current are not consistent with another.		• Check the motor rated current and no-load current. • Correct the settings of parameters T1-04 and E2-03.
Base frequency and motor rated speed (T1-05 and T1-07) do not match.		• Set T1-05 and T1-07 to the correct value. • Check if the correct pole number was entered to T1-06.

Digital Operator Display		Error Name
Er-02	Er-02	Minor Fault
Cause		**Possible Solutions**
An alarm was triggered during Auto-Tuning.		Exit the Auto-Tuning menu, check the alarm code, remove the alarm cause, and repeat Auto-Tuning.
Digital Operator Display		**Error Name**
Er-03	Er-03	STOP Button Input
Cause		**Possible Solutions**
Auto-Tuning canceled by pressing STOP button.		Auto-Tuning did not complete properly and will have to be performed again.
Digital Operator Display		**Error Name**
Er-04	Er-04	Line-to-Line Resistance Error
Cause		**Possible Solutions**
Motor data entered during Auto-Tuning was incorrect.		• Make sure the data entered to the T1 parameters match the information written on the motor nameplate. • Restart Auto-Tuning and enter the correct information.
Results from Auto-Tuning are outside the parameter setting range or the tuning process took too long.		Check and correct faulty motor wiring.
Motor cable or cable connection faulty.		
Digital Operator Display		**Error Name**
Er-05	Er-05	No-Load Current Error
Cause		**Possible Solutions**
Motor data entered during Auto-Tuning was incorrect.		• Make sure the data entered to the T1 parameters match the information written on the motor nameplate. • Restart Auto-Tuning and enter the correct information.
Results from Auto-Tuning are outside the parameter setting range or the tuning process took too long.		• Check and correct faulty motor wiring. • Perform Rotational Auto-Tuning.
The load during Rotational Auto-tuning was too high.		• Disconnect the motor from machine and restart Auto-Tuning. If motor and load cannot be uncoupled make sure the load is lower than 30%. • If a mechanical brake is installed, make sure it is fully lifted during tuning.
Digital Operator Display		**Error Name**
Er-08	Er-08	Rated Slip Error
Cause		**Possible Solutions**
Motor data entered during Auto-Tuning was incorrect.		• Make sure the data entered to the T1 parameters match the information written on the motor nameplate. • Restart Auto-Tuning and enter the correct information.
Drive-calculated values outside parameter setting range or the tuning process took too long.		• Check and correct faulty motor wiring. • Perform Rotational Auto-Tuning.
The load during rotational Auto-tuning was too high.		• Disconnect the motor from machine and restart Auto-Tuning. If motor and load cannot be uncoupled make sure the load is lower than 30%. • If a mechanical brake is installed, make sure it is fully lifted during tuning.
Digital Operator Display		**Error Name**
Er-09	Er-09	Acceleration Error
Cause		**Possible Solutions**
The motor did not accelerate for the specified acceleration time.		• Increase the acceleration time (C1-01). • Check if it is possible to disconnect the machine from the motor.
Torque limit when motoring is too low (L7-01 and L7-02).		• Check the settings of parameters L7-01 and L7-02. • Increase the setting.
The load during Rotational Auto-Tuning was too high.		• Disconnect the motor from machine and restart Auto-Tuning. If motor and load cannot be uncoupled make sure the load is lower than 30%. • If a mechanical brake is installed, make sure it is fully lifted during tuning.
Digital Operator Display		**Error Name**
Er-10	Er-10	Motor Direction Error
Cause		**Possible Solutions**
The encoder signal lines are not properly connected to the drive.		Check and correct wiring to the PG encoder.
Motor and PG direction are opposite.		Check the motor speed monitor U1-05 while turning the motor manually in forward direction. If the sign displayed is negative, change the setting of parameter F1-05.
The load pulled the motor in the opposite direction of the speed reference and the torque exceeded 100%.		Uncouple the motor from the load and repeat Auto-Tuning.
Digital Operator Display		**Error Name**
Er-11	Er-11	Motor Speed Fault
Cause		**Possible Solutions**
Torque reference is too high.		• Increase the acceleration time (C1-01). • Disconnect the machine from the motor, if possible.

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Digital Operator Display		Error Name
Er-12	Er-12	Current Detection Error
Cause		**Possible Solutions**
One of the motor phases is missing: (U/T1, V/T2, W/T3).		Check motor wiring and correct any problems.
Current exceeded the current rating of the drive.		• Check the motor wiring for a short between motor lines.
The current is too low.		• If a magnetic contactor is used between motors, make sure it is closed. • Replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.
Attempted Auto-Tuning without motor connected to the drive.		Connect the motor and perform Auto-Tuning.
Current detection signal error.		Replace either the control board or the entire drive. For instructions on replacing the control board, contact Yaskawa or your nearest sales representative.
Digital Operator Display		**Error Name**
Er-13	Er-13	Leakage Inductance Error
Cause		**Possible Solutions**
Drive was unable to complete tuning for leakage inductance within 300 seconds.		• Check all wiring and correct any mistakes. • Double check the motor rated current value that was entered to T1-04 for Auto-Tuning. • Check the motor rated current value written on the motor nameplate and enter the correct value.
Digital Operator Display		**Error Name**
Er-14	Er-14	Motor Speed Error 2
Cause		**Possible Solutions**
The motor speed exceeded twice the amplitude of speed reference during Inertia Tuning.		Reduce the ASR gain set to C5-01.
Digital Operator Display		**Error Name**
Er-15	Er-15	Torque Saturation Error
Cause		**Possible Solutions**
The output torque reached the torque limit set in L7-01 through L7-04 during Inertia Tuning.		• Increase the torque limits in L7-01 through L7-04 (but keep them within reasonable limits). • First try reducing the test signal amplitude in T3-01 and repeat the tuning. If necessary, then try reducing the test signal frequency (T3-02) and repeat the tuning.
Digital Operator Display		**Error Name**
Er-16	Er-16	Inertia Detection Error
Cause		**Possible Solutions**
The inertia identified by the drive was abnormally small or abnormally large during Inertia Tuning.		• First try reducing the test signal amplitude in T3-01 and repeat the tuning. If necessary, then try reducing the test signal frequency (T3-02) and repeat the tuning. • Check the basic motor inertia value entered to T3-03.
Digital Operator Display		**Error Name**
Er-17	Er-17	Reverse Prohibited Error
Cause		**Possible Solutions**
Drive is prohibited from rotating the motor in reverse while attempting to perform Inertia Tuning.		• Inertia Auto-Tuning cannot be performed if the drive is restricted from rotating in reverse. • Assuming it is acceptable for the application to rotate in reverse, set b1-04 to 0 and then execute Inertia Tuning.
Digital Operator Display		**Error Name**
Er-18	Er-18	Induction Voltage Error
Cause		**Possible Solutions**
The result of Back EMF Constant Tuning (induced voltage) exceeds the allowable setting range.		Double check the data that was entered to the T2-□□ parameters, and perform Auto-Tuning again.
Digital Operator Display		**Error Name**
Er-19	Er-19	PM Inductance Error
Cause		**Possible Solutions**
The induced voltage constant inductance values set to E5-08 or E5-09 exceed the allowable range.		Double check the data that was entered to the T2-□□ parameters, and perform Auto-Tuning again.
Digital Operator Display		**Error Name**
Er-20	Er-20	Stator Resistance Error
Cause		**Possible Solutions**
Stator resistance tuning attempted to set a value to E5-06 that is outside the allowable setting range.		Double check the data that was entered to the T2-□□ parameters, and perform Auto-Tuning again.
Digital Operator Display		**Error Name**
Er-21	Er-21	Z Pulse Correction Error
Cause		**Possible Solutions**
Motor was coasting when Auto-Tuning was performed.		Make sure the motor has stopped completely. Repeat Auto-Tuning.
Either the motor or the PG encoder on the motor is not properly wired.		Check the wiring for the motor and the PG encoder. Repeat Auto-Tuning.
The direction for the PG encoder is set incorrectly, or the number of pulses set for the PG encoder is wrong.		Check the direction and number of pulses set for the PG encoder. Repeat Auto-Tuning.
PG encoder is damaged.		Check the signal output from the PG encoder attached to the motor. Replace the PG if damaged.

6.8 Copy Function Related Displays

◆ Tasks, Errors, and Troubleshooting

The table below lists the messages and errors that may appear when using the Copy function.

When executing the tasks offered by the Copy function, the operator will indicate the task being performed. When an error occurs, a code appears on the operator to indicate the error. Note that errors related to the Copy function do not trigger a multi-function output terminal that has been set up to close when a fault or alarm occurs. To clear an error, simply press any key on the operator and the error display will disappear.

Table 6.19 lists the corrective action that can be taken when an error occurs.

Note: 1. Whenever using the copy function, the drive should be fully stopped.
2. The drive will not accept a Run command while the Copy function is being executed.
3. Parameters can only be saved to a drive when the voltage class, capacity, control mode, and software version match.

Table 6.19 Copy Function Task and Error Displays

Digital Operator Display		Task
CoPy	CoPy	Writing Parameter Settings (flashing)
Cause		**Possible Solutions**
Parameters are being written to the drive.		Not an error.
Digital Operator Display		**Task**
CPEr	CPEr	Control Mode Mismatch
Cause		**Possible Solutions**
Control mode of the parameters to be loaded onto the drive and the control mode already set to the drive don't match.		Check the control mode for the parameters that are to be loaded onto the drive and the control mode set to the drive those parameters will be written to. Set the same control mode using parameter A1-02 and try again.
Digital Operator Display		**Task**
CPyE	CPyE	Error Writing Data
Cause		**Possible Solutions**
Failed writing parameters.		Try writing parameters again.
Digital Operator Display		**Task**
CSEr	CSEr	Copy Unit Error
Cause		**Possible Solutions**
Hardware fault		Replace the operator or the USB Copy Unit.
Digital Operator Display		**Task**
dFPS	dFPS	Drive Model Mismatch
Cause		**Possible Solutions**
The drive from which the parameter were copied and the drive you are attempting to write to are not the same model. • The drive the parameters were copied from is a different model drive. • The drive you attempting to write to is a different model.		Check the model number of the drive that the parameters were copied from and the model of the drive you are attempting to write those parameters to. Make sure the drive from which the parameter are copied and the drive to be written to have the same model numbers and software versions.
Digital Operator Display		**Task**
End	End	Task Complete
Cause		**Possible Solutions**
Finished reading, writing, or verifying parameters.		Not an error.
Digital Operator Display		**Task**
iFEr	iFEr	Communication Error
Cause		**Possible Solutions**
A communication error occurred between the drive and the operator or the USB copy unit.		Check the cable connection.
A non-compatible cable is being used to connect the USB Copy Unit and the drive.		Use the cable originally packaged with the USB Copy Unit.
Digital Operator Display		**Task**
ndAT	ndAT	Model, Voltage Class, Capacity Mismatch
Cause		**Possible Solutions**
The drive the parameters were copied from and the drive you are attempting to write to have different electrical specifications, a different capacity, is set to a different control mode, or is a different model number.		Make sure model numbers and specifications are the same for both drives.
The device being used to write the parameters is blank and does not have any parameters saved on it.		Making sure all connections are correct, and copy the parameter settings onto the USB Copy Unit or the operator.

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Digital Operator Display		Task
rdEr	rdEr	Error Reading Data
Cause		**Possible Solutions**
Failed while attempting to read parameter settings from the drive.		Press and hold the READ key on the USB Copy Unit for at least one second to have the unit read parameters from the drive.
Digital Operator Display		Task
rEAd	rEAd	Reading Parameter Settings (flashing)
Cause		**Possible Solutions**
Displayed while the parameter settings are being read onto the USB Copy Unit.		Not an error.
Digital Operator Display		Task
vAEr	vAEr	Voltage Class, Capacity Mismatch
Cause		**Possible Solutions**
The drive the parameters were copied from and the drive you performing the Verify mode on have different electrical specifications or are a different capacity.		Make sure electrical specifications and capacities are the same for both drives.
Digital Operator Display		Task
vFyE	vFyE	Parameter settings in the drive and those saved to the copy function are not the same
Cause		**Possible Solutions**
Indicates that parameter settings that have been Read and loaded onto the Copy Unit or Digital Operator are different.		To have parameters be the same, either write the parameters save on the USB Copy Unit or LCD digital operator onto the drive, or Read the parameter settings on the drive onto the USB Copy Unit.
Digital Operator Display		Task
vrFy	vrFy	Comparing Parameter Settings (flashing)
Cause		**Possible Solutions**
The Verify mode has confirmed that parameters settings on the drive and parameters read to the copy device are identical.		Not an error.

6.9 Diagnosing and Resetting Faults

When a fault occurs and the drive stops, follow the instructions below to remove whatever conditions triggered the fault, then restart the drive.

◆ Fault Occurs Simultaneously with Power Loss

WARNING! *Electrical Shock Hazard. Ensure there are no short circuits between the main circuit terminals (R/L1, S/L2, and T/L3) or between the ground and main circuit terminals before restarting the drive. Failure to comply may result in serious injury or death and will cause damage to equipment.*

1. Turn on the drive input power.
2. Use monitor parameters U2-□□ to display data on the operating status of the drive just before the fault occurred.
3. Remove the cause of the fault and reset.

Note: 1. To find out what faults were triggered, check the fault history in U2-02. Information on drive status when the fault occurred such as the frequency, current, and voltage can be found in U2-03 through U2-20. *Refer to Viewing Fault Trace Data After Fault on page 341* for information on how to view fault data.
2. When the fault continues to be displayed after cycling power, remove the cause of the fault and reset.

◆ If the Drive Still has Power After a Fault Occurs

1. Look at the digital operator for information on the fault that occurred.
2. *Refer to Fault Displays, Causes, and Possible Solutions on page 314*
3. Reset the fault. *Refer to Fault Reset Methods on page 342*.
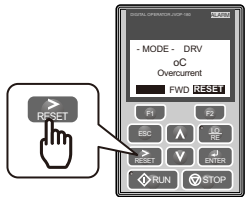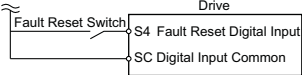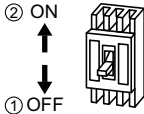
◆ Viewing Fault Trace Data After Fault

	Step		Display/Result
1.	Turn on the drive input power. The first screen displays.	➡	- MODE - DRV Rdy FREF (OPR) U1-01= 0.00Hz U1-02= 0.00Hz LSEQ U1-03= 0.00A LREF JOG FWD FWD/REV
2.	Press △ or ▽ until the monitor screen is displayed.	➡	- MODE - DRV Rdy Monitor Menu U1-01= 0.00Hz U1-02= 0.00Hz LSEQ U1-03= 0.00A LREF JOG FWD FWD/REV
3.	Press ⏎ ENTER to display the parameter setting screen.	➡	-MONITR- DRV Rdy Monitor U1-01= 0.00Hz U1-02= 0.00Hz LSEQ U1-03= 0.00A LREF JOG FWD FWD/REV
4.	Press △ and ▷ RESET to scroll to monitor U2-02. The fault code shown in U2-02 is the fault that occurred last.	➡	- MONITR - DRV Rdy Last Fault U2-02= oC U2-03= 0.00Hz LSEQ U2-04= 0.00Hz LREF JOG FWD FWD/REV
7.	Press △ to view drive status information when fault occurred. Parameters U2-03 through U2-20 help determine the cause of a fault. Parameters to be monitored differ depending on the control mode.	➡	- MONITR - DRV Rdy Frequency Ref U2-03= 0.00Hz U2-04= 0.00Hz LSEQ U2-05= 0.00A LREF JOG FWD FWD/REV ⋮ - MONITR - DRV Rdy Heatsink Temp U2-20= XX °C U2-01= ――― LSEQ U2-02= ――― LREF JOG FWD FWD/REV

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◆ Fault Reset Methods

When a fault occurs, the cause of the fault must be removed and the drive must be restarted. The table below lists the different ways to restart the drive.

After the Fault Occurs	Procedure	
Fix the cause of the fault, restart the drive, and reset the fault	Press ▷ on the digital operator.	
Resetting via Fault Reset Digital Input S4	Close then open the fault signal digital input via terminal S4. S4 is set for "Fault Reset" as default (H1-04 = 14).	
If the above methods do not reset the fault, turn off the drive main power supply. Reapply power after the digital operator display is out.		

Note: If the Run command is present, the drive will disregard any attempts to reset the fault. The Run command must first be removed before a fault situation can be cleared.

6.10 Troubleshooting without Fault Display

This section describes troubleshooting problems that do not trip an alarm or fault.

The following symptoms indicate that the drive is not set correctly for proper performance with the motor. Refer to *Motor Performance Fine-Tuning on page 304* for guidance on troubleshooting.

- Motor hunting and oscillation
- Poor motor torque
- Poor speed precision
- Poor motor torque and speed response
- Motor noise

◆ Common Problems

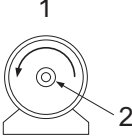| Common Problems		Page
Cannot Change Parameter Settings		*343*
Motor Does Not Rotate Properly after Pressing RUN Button or after Entering External Run Command	Motor Does Not Rotate	*344*
	Motor Rotates in the Opposite Direction from the Run Command	*345*
	Motor Rotates in One Direction Only	*345*
Motor is Too Hot		*345*
Drive Does Not Allow Selection of Rotational Auto-Tuning		*345*
oPE02 Error Occurs When Lowering the Motor Rated Current Setting		*345*
Motor Stalls During Acceleration or With Large Loads		*346*
Drive Frequency Reference Differs from the Controller Frequency Reference Command		*346*
Excessive Motor Oscillation and Erratic Rotation		*346*
Deceleration Takes Longer Than Expected with Dynamic Braking Enabled		*347*
Load Falls When Brake is Applied (Hoist-Type Applications)		*347*
Noise From Drive or Motor Cables When the Drive is Powered On		*347*
Equipment for Residual Current Monitoring/Detection (RCM/RCD) Trips During Run.		*347*
Connected Machinery Vibrates When Motor Rotates	Unexpected Noise from Connected Machinery	*347*
	Oscillation or Hunting	*347*
PID Output Fault		*348*
Insufficient Starting Torque		*348*
Motor Rotates After the Drive Output is Shut Off (Motor Rotates During DC Injection Braking)		*348*
Output Frequency is not as High as Frequency Reference		*348*
Buzzing Sound from Motor at 2 kHz		*348*
Unstable Motor Speed when Using PM or IPM		*348*
Motor Does Not Restart after Power Loss		*349*

◆ Cannot Change Parameter Settings

Cause	Possible Solutions
The drive is running the motor (i.e., the Run command is present).	• Stop the drive and switch over to the Programming Mode. • Most parameters cannot be edited during run.
The Access Level is set to restrict access to parameter settings.	• Set the Access Level to allow parameters to be edited (A1-01 = 2).
The operator is not in the Parameter Setup Mode (the screen will display "PAr").	• See what mode the operator is currently set for. • Parameters cannot be edited when in the Setup Mode ("STUP"). Switch modes so that "PAr" appears on the screen. Refer to *The Drive and Programming Modes on page 93*.
A multi-function contact input terminal is set to allow or restrict parameter editing (H1-01 through H1-08 = 1B).	• When the terminal is open, parameters cannot be edited. • Turn on the multi-function contact input set to 1B.
The wrong password was entered.	• If the password entered to A1-04 does not match the password saved to A1-05, then drive settings cannot be changed. • Reset the password. If you cannot remember the password: • Scroll to A1-04. Press the ⊘ STOP button and press ⋀ at the same time. Parameter A1-05 will appear. • Set a new password to parameter A1-05.
Undervoltage was detected.	• Check the drive input power voltage by looking at the DC bus voltage (U1-07). • Check all main circuit wiring.

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◆ Motor Does Not Rotate Properly after Pressing RUN Button or after Entering External Run Command

■ Motor Does Not Rotate

Cause	Possible Solutions
The drive is not in the Drive Mode.	• Check if the DRV light on the digital operator is lit. • Enter the Drive Mode to begin operating the motor. *Refer to The Drive and Programming Modes on page 93*.
The ⬤ LO/RE button was pushed.	Stop the drive and check if the correct frequency reference source is selected. If the operator keypad shall be the source, the LO/RE button LED must be on. If the source is REMOTE, it must be off. Take the following steps to solve the problem: • Push the ⬤ LO/RE button. • If o2-01 is set to 0, then the LO/RE button will be disabled.
Auto-Tuning has just completed.	• When Auto-Tuning completes, the drive is switched back to the Programming Mode. The Run command will not be accepted unless the drive is in the Drive Mode. • Use the digital operator to enter the Drive Mode. *Refer to The Drive and Programming Modes on page 93*.
A Fast Stop was executed and has not yet been reset.	Reset the Fast Stop command.
Settings are incorrect for the source that provides the Run command.	Check parameter b1-02 (Run Command Selection). Set b1-02 so that it corresponds with the correct Run command source. 0: Digital operator 1: Control circuit terminal (default setting) 2: MEMOBUS/Modbus communications 3: Option card
There is faulty wiring in the control circuit terminals.	• Check the wiring for the control terminal. • Correct wiring mistakes. • Check the input terminal status monitor (U1-10).
The drive has been set to accept the frequency reference from the incorrect source.	Check parameter b1-01 (Frequency Reference Selection 1). Set b1-01 to the correct source of the frequency reference. 0: Digital operator 1: Control circuit terminal (default setting) 2: MEMOBUS/Modbus communications 3: Option card 4: Pulse train input (RP)
The terminal set to accept the main speed reference is set to the incorrect voltage and/or current.	If the frequency reference is set at terminal A1, check parameter H3-01 for the correct signal level selection. If terminal A2 is used, check DIP switch S1 parameter H3-08. If terminal A3 is used, check parameter H3-08. *Refer to Terminal A2 Input Signal Selection on page 82*.
Selection for the sink/source mode and the internal/external power supply is incorrect.	Check jumper S3. *Refer to Sinking/Sourcing Mode Switch for Digital Inputs on page 80*.
Frequency reference is too low.	• Check the frequency reference monitor (U1-01). • Increase the frequency by changing the maximum output frequency (E1-09).
Multi-function analog input is set up to accept gain for the frequency reference, but no voltage (current) has been provided.	• Check the multi-function analog input settings. • Check if analog input A1, A2, or A3 is set for frequency reference gain (H3-02, H3-10, H3-06 = 1). If so, check if the correct signal is applied to the terminal. The gain and the frequency reference will be 0 if no signal is applied to the gain input. • Check if H3-02, H3-10, and H3-06 have been set to the proper values. • Check if the analog input value has been set properly. (U1-13 to U1-15)
The ⊘ STOP button was pressed when the drive was started from a REMOTE source.	• When the ⊘ STOP button is pressed, the drive will decelerate to stop. • Switch off the Run command and then re-enter a new Run command. • The ⊘ STOP button can be disabled when o2-02 is set to 0.
Motor starting torque is too low.	*Refer to Motor Performance Fine-Tuning on page 304*
Frequency reference value is too low or the drive does not accept the value entered.	Enter a value that is above the minimum output frequency determined by E1-09.
The sequence Start/Stop sequence is set up incorrectly.	• If the drive is supposed to be set up for a 2-wire sequence, then ensure parameters H1-03 through H1-08 are not set to 0. • If the drive is supposed to be set up for a 3-wire sequence, then one of the parameters H1-03 through H1-08 must be set to 0. Terminal S1 will become the Start, terminal S2 will become the Stop input.

■ Motor Rotates in the Opposite Direction from the Run Command

Cause	Possible Solutions
Phase wiring between the drive and motor is incorrect.	• Check the motor wiring. • Switch two motor cables (U, V, and W) to reverse motor direction. • Connect drive output terminals U/T1, V/T2, and W/T3 in the right order to match motor terminals U, V, and W. • Change the setting of parameter b1-14.
The forward direction for the motor is setup incorrectly.	Typically, forward is designated as being counterclockwise when looking from the motor shaft (see figure below). 1. Forward Rotating Motor (looking down the motor shaft) 2. Motor Shaft
The motor is running at almost 0 Hz and the Speed Search estimated the speed to be in the opposite direction.	• Disable bi-directional search (b3-14 = "0") so that Speed Search is performed only in the specified direction.

> **Note:** Check the motor specifications for the forward and reverse directions. The motor specifications will vary depending on the manufacturer of the motor.

■ Motor Rotates in One Direction Only

Cause	Possible Solutions
The drive prohibits reverse rotation.	• Check parameter b1-04. • Set the drive to allow the motor to rotate in reverse (b1-04 = 0).
A Reverse run signal has not been entered, although 3-wire sequence is selected.	• Make sure that one of the input terminals S3 to S8 used for the 3-wire sequence has been set for reverse.

◆ Motor is Too Hot

Cause	Possible Solutions
The load is too heavy.	If the load is too heavy for the motor, the motor will overheat as it exceeds its rated torque value for an extended period of time. Keep in mind that the motor also has a short-term overload rating in addition to the possible solutions provided below: • Reduce the load. • Increase the acceleration and deceleration times. • Check the values set for the motor protection (L1-01, L1-02) as well as the motor rated current (E2-01). • Increase motor capacity.
The air around the motor is too hot.	• Check the ambient temperature. • Cool the area until it is within the specified temperature range.
The drive is operating in a vector control mode but Auto-Tuning has not yet been performed.	• Perform Auto-Tuning. • Calculate the motor value and reset the motor parameters. • Change the motor control method to V/f Control (A1-02 = 0).
Insufficient voltage insulation between motor phases.	When the motor cable is long, high voltage surges occur between the motor coils and drive switching. Normally, surges can reach up to three times the drive input power supply voltage (600 V for 200 V class, and 1200 V for 400 V class). • Use a motor with a voltage tolerance higher than the max voltage surge. • Use a motor designed to work specifically with a drive when using a 400 V class unit. • Install an AC reactor on the output side of the drive. The carrier frequency should be set to 2 kHz when installing an AC reactor.
The motor fan has stopped or is clogged.	Check the motor fan.
Carrier frequency is too low.	Increase the carrier frequency to lower the current harmonic distortion and lower the motor temperature.

◆ Drive Does Not Allow Selection the Desired Auto-Tuning Mode

Cause	Possible Solutions
The desired Auto-Tuning mode is not available for the selected control mode.	• Check if the desired tuning mode is available for the selected control mode. Refer to *Auto-Tuning on page 110*. • Change the motor control method by setting A1-02.

◆ oPE02 Error Occurs When Lowering the Motor Rated Current Setting

Cause	Possible Solutions
Motor rated current and the motor no-load current setting in the drive are incorrect.	• The user is trying to set the motor rated current in E2-01 to a value lower than the no-load current set in E2-03. • Make sure that value set in E2-01 is higher than E2-03. • If it is necessary to set E2-01 lower than E2-03, first lower the value set to E2-03, then change the setting in E2-01 as needed.

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◆ Motor Stalls during Acceleration or Acceleration Time is Too Long

Cause	Possible Solutions
Torque limit has been reached or current suppression keeps the drive from accelerating.	Take the following steps to resolve the problem: • Reduce the load. • Increase motor capacity. **Note:** Although the drive has a Stall Prevention function and a Torque Compensation Limit function, accelerating too quickly or trying to drive an excessively large load can exceed the capabilities of the motor.
Load is too heavy.	
Torque limit is not set properly.	Check the torque limit setting.
Frequency reference is too low.	• Check the maximum output frequency (E1-04). • Increase E1-04 if it is set too low.
	Check U1-01 for proper frequency reference.
	Check if a frequency reference signal switch has been set to one of the multi-function input terminals.
	Check for low gain level set to terminals A1, A2, or A3 (H3-03, H3-11, H3-07).
Load is too heavy.	• Reduce the load so that the output current remains within the motor rated current. • In extruder and mixer applications, the load will sometimes increase as the temperature drops.
	• Increase the acceleration time. • Check if the mechanical brake is fully releasing as it should.
Acceleration time has been set too long.	Check if the acceleration time parameters have been set too long (C1-01, C1-03, C1-05, C1-07).
Motor characteristics and drive parameter settings are incompatible with one another.	• Set the correct V/f pattern so that it matches the characteristics of the motor being used. • Check the V/f pattern set to E1-03. • Execute Rotational Auto-Tuning.
Although the drive is operating in Open Loop Vector motor control method, Auto-Tuning has not been performed.	• Perform Auto-Tuning. • Calculate motor data and reset motor parameters. • Switch to V/f Control (A1-02 = 0).
Incorrect frequency reference setting.	• Check the multi-function analog input settings. Multi-function analog input terminal A1, A2, or A3 is set for frequency gain (H3-02, H3-10, or H3-06 is set to "1"), but there is no voltage or current input provided. • Make sure H3-02, H3-10, and H3-06 are set to the proper values. • See if the analog input value is set to the right value (U1-13 to U1-15).
The Stall Prevention level during acceleration and deceleration set too low.	• Check the Stall Prevention level during acceleration (L3-02). • If L3-02 is set too low, acceleration may be taking too long. • Increase L3-02.
The Stall Prevention level during run has been set too low.	• Check the Stall Prevention level during run (L3-06). • If L3-06 is set too low, speed will drop as the drive outputs torque. • Increase the setting value.
Drive reached the limitations of the V/f motor control method.	• The motor cable may be long enough (over 50 m) to require Auto-Tuning for line-to-line resistance. • Be aware that V/f Control is comparatively limited when it comes to producing torque at low speeds. • Consider switching to Open Loop Vector Control.

◆ Drive Frequency Reference Differs from the Controller Frequency Reference Command

Cause	Possible Solutions
The analog input gain and bias for the frequency reference input are set to incorrect values.	• Check the gain and bias settings for the analog inputs that are used to set the frequency reference. Check parameters H3-03 and H3-04 for input A1, check parameters H3-11 and H3-12 for input A2, and check parameters H3-07 and H3-08 for input A3. • Set these parameters to the appropriate values.
A frequency bias signal is being entered via analog input terminals A1 to A3.	• If more than one of multi-function analog inputs A1 to A3 is set for frequency reference bias (H3-02, H3-10, or H3-06 is set to "0"), then the sum of all signals builds the frequency reference. • Make sure that H3-02, H3-10, and H3-06 are set appropriately. • Check the input level set for terminals A1 to A3 (U1-13 to U1-15).
PID control is enabled, and the drive is consequently adjusting the output frequency to match the PID setpoint. The drive will only accelerate to the maximum output frequency set in E1-04 while PID control is active.	If PID control is not necessary for the application, disable it by setting b5-01 to "0".

◆ Excessive Motor Oscillation and Erratic Rotation

Cause	Possible Solutions
Poor balance between motor phases.	Check drive input power voltage to ensure that it provides stable power.
Hunting prevention function is disabled.	• Enable Hunting Prevention (n1-01 = 1). • Increase the AFR gain (n2-01) or the AFR time constant (n2-02).

◆ Deceleration Takes Longer Than Expected with Dynamic Braking Enabled

Cause	Possible Solutions
L3-04 is set incorrectly.	• Check the Stall Prevention level during deceleration (L3-04). • If a dynamic braking option has been installed, disable Stall Prevention during deceleration (L3-04 = 0).
The deceleration time is set too long.	Set deceleration to more appropriate time (C1-02, C1-04, C1-06, C1-08).
Insufficient motor torque.	• Assuming parameter settings are normal and that no overvoltage occurs when there is insufficient torque, it is likely that the demand on the motor has exceeded the motor capacity. • Use a larger motor.
Reaching the torque limit.	• Check the settings for the torque limit (L7-01 through L7-04). • If the torque limit is enabled, deceleration might take longer than expected because the drive cannot output more torque than the limit setting. Ensure the torque limit is set to a high enough value. • Increase the torque limit setting.
	• If multi-function analog input terminal A1, A2, or A3 is set to torque limit (H3-02, H3-10, or H3-06 equals 10, 11, 12, or 15), ensure that the analog input levels are set to the correct levels. • Ensure H3-02, H3-10, and H3-06 are set to the right levels. • Ensure the analog input is set to the correct value (U1-13 to U1-15).
Load exceeded the internal torque limit determined by the drive rated current.	Switch to a larger capacity drive.

◆ Load Falls When Brake is Applied (Hoist-Type Applications)

Cause	Possible Solutions
The timing for the brake to close and release is not set properly.	Refer to *Notes on Controlling the Brake when Using the Hoist Application Preset on page 107*.
Insufficient DC Injection Braking.	Increase the amount of DC Injection Braking (b2-02).

◆ Noise From Drive or Motor Cables When the Drive is Powered On

Cause	Possible Solutions
Relay switching in the drive generates excessive noise.	• Lower the carrier frequency (C6-02). • Install a noise filter on the input side of drive input power. • Install a noise filter on the output side of the drive. • Place the wiring inside a metal conduit to shield it from switching noise. • Ground the drive and motor properly. • Separate the main circuit wiring and the control lines. • Make sure wires and the motor have been properly grounded.

◆ Equipment for Residual Current Monitoring/Detection (RCM/RCD) Trips During Run

Cause	Possible Solutions
Excessive leakage current trips RCM/RCD.	• Increase the RCM/RCD sensitivity or use RCM/RCD with a higher threshold. • Lower the carrier frequency (C6-02). • Reduce the length of the cable used between the drive and the motor. • Install a noise filter or reactor on the output side of the drive. Set the carrier frequency to 2 kHz when connecting a reactor.

◆ Connected Machinery Vibrates When Motor Rotates

■ Unexpected Noise from Connected Machinery

Cause	Possible Solutions
The carrier frequency is at the resonant frequency of the connected machinery.	Adjust the carrier frequency using parameters C6-02 through C6-05.
The drive output frequency is the same as the resonant frequency of the connected machinery.	• Adjust the parameters used for the Jump frequency function (d3-01 through d3-04) to skip the problem-causing bandwidth. • Place the motor on a rubber pad to reduce vibration.

Note: The drive may have trouble assessing the status of the load due to white noise generated from using Swing PWM (C6-02 = 7 to A).

■ Oscillation or Hunting

Cause	Possible Solutions
Insufficient tuning.	Perform Auto-Tuning. Refer to *Motor Performance Fine-Tuning on page 304*.
Gain is too low when using PID control.	Refer to *b5: PID Control on page 152* for details.
The frequency reference is assigned to an external source and the signal is noisy.	• Ensure that noise is not affecting the signal lines. • Separate main circuit wiring and control circuit wiring. • Use twisted-pair cables or shielded wiring for the control circuit. • Increase the analog input time filter constant (H3-13).
The cable between the drive and motor is too long.	• Perform Auto-Tuning. • Reduce the length of the cable.

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◆ PID Output Fault

Cause	Possible Solutions
No PID feedback input.	• Check the multi-function analog input terminal settings. • Set multi-function analog input terminal A1, A2, or A3 for PID feedback (H3-02, H3-10, or H3-06 = "B"). • A signal input to the terminal selection for PID feedback is needed. • Check the connection of the feedback signal. • Check the various PID-related parameter settings. • No PID feedback input to the terminal causes the value detected to be 0, causing a PID fault and the drive to operate at max frequency.
The level of detection and the target value do not correspond with each other.	• PID control keeps the difference between target and detection values at 0. Set the input level for the values relative to one another. • Use analog input gains H3-03 and H3-11 to adjust PID target and feedback signal scaling.
Reverse drive output frequency and speed detection. When output frequency rises, the sensor detects a speed decrease.	Set PID output for reverse characteristics (b5-09 = 1).
Adjustment made to PID parameter settings are insufficient.	Refer to *b5: PID Control on page 152* for details.

◆ Insufficient Starting Torque

Cause	Possible Solutions
Auto-Tuning has not yet been performed (required for vector control modes).	Perform Auto-Tuning. Refer to *Motor Performance Fine-Tuning on page 304*.
The control mode was changed after performing Auto-Tuning.	Perform Auto-Tuning again.
Only Stationary Auto-Tuning was performed.	Perform Rotational Auto-Tuning.

◆ Motor Rotates After the Drive Output is Shut Off (Motor Rotates During DC Injection Braking)

Cause	Possible Solutions
DC Injection Braking is set too low and the drive cannot decelerate properly.	• Adjust the DC Injection braking settings. • Increase the current level for DC Injection Braking (b2-02). • Increase the DC Injection Braking time at stop (b2-04).
The stopping method is set so that the drive coasts to stop.	Set b1-03 (Stopping Method Selection) to 0 or 2.

◆ Output Frequency is not as High as Frequency Reference

Cause	Possible Solutions
Frequency reference is set within the range of the Jump frequency.	• Adjust the parameters used for the Jump frequency function (d3-01, d3-02, d3-03). • Enabling the Jump frequency prevents the drive from outputting the frequencies specified in the Jump range.
Upper limit for the frequency reference has been exceeded.	• Set the maximum output frequency and the upper limit for the frequency reference to more appropriate values (E1-04, d2-01). • The following calculation yields the upper value for the output frequency = E1-04 x d2-01 / 100
Large load triggered Stall Prevention function during acceleration.	• Reduce the load. • Adjust the Stall Prevention level during acceleration (L3-02).

◆ Buzzing Sound from Motor at 2 kHz

Cause	Possible Solutions
Exceeded 110% of the rated output current of the drive while operating at low speeds.	• If the output current rises too high at low speeds, the carrier frequency is automatically reduced and causes a whining or buzzing sound. • If the sound is coming from the motor, disable carrier frequency derating (L8-38 = 0). • Disabling the automatic carrier frequency derating increases the chances of an overload fault (oL2). Switch to a larger capacity motor if oL2 faults occur too frequently.

◆ Unstable Motor Speed when Using PM

Cause	Possible Solutions
The motor code for the PM motor (E5-01 or T2-02) is set incorrectly (Yaskawa motors only).	Refer to *Motor Performance Fine-Tuning on page 304* for details.
Drive is attempting to operate the motor beyond the speed control range listed in the specifications.	Check the speed control range and adjust the speed accordingly.
Motor hunting occurs.	Refer to *Motor Performance Fine-Tuning on page 304* for details.
Hunting occurs at start.	Increase the S-curve time at the start of acceleration (C2-01).
Too much current is flowing through the drive.	• Enter the correct motor code for the PM motor being used into E5-01. • For special-purpose motors, enter the correct data to all E5 parameters according to the test report provided for the motor.

◆ Motor Does Not Restart after Power Loss

Cause	Possible Solutions
The Run command was not issued again when power was restored.	• Check the sequence and wiring that has been set up to enter the Run command. • A relay should be set up to make sure the Run command remains enabled throughout any power loss.
The relay that is supposed to maintain the Run command has been switched off.	Check wiring and circuitry for the relay intended to keep the Run command enabled.

Troubleshooting

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